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NEWSPAPER

IBM in Contempt, Hearing Set on Fine

NEW YORK — Judge David N. Edelstein found IBM in civil contempt of court and fined it \$150,000 per day effective Aug. 3 until it delivers certain documents to the Justice Department.

But Judge William H. Mulligan in the U.S. Court of Appeals, New York, granted a stay of Edelstein's order Aug. 2 until the argument is appealed, and set a hearing for Aug. 8.

The stay means the daily fine would not go into effect until after Aug. 8.

IBM was found in contempt of court for its failure to comply with Pretrial Order No. 5, entered Sept. 26, 1972, which required IBM to produce to the Justice Department certain documents that IBM has claimed are privileged under the attorney-client relationship.

"In no event shall the sanction imposed by this order continue beyond the time that this action is finally terminated and all appeals have been completed or the time for appeal has expired, whichever is sooner," the order directed.

Upon delivery of the documents to the plaintiff, IBM is exempt from the fine for that day and succeeding days. The fine shall be paid to the U.S. General Treasury.

Lead government attorney Raymond Carlson had asked that IBM be fined 5% of its daily net income, if it were found in contempt.

Judge Simon Rifkind, whose firm represents both IBM and its legal counsel of Cravath, Swaine and Moore, proposed that Edelstein enter an order against the legal firm, rather than IBM, and impose a light sentence [CW, July 25].

Edelstein has yet to rule on an IBM motion to compel the Justice Department to account for and stop alleged destruction of documents IBM is seeking from government agencies for preparation of its case.

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HEW Chief Preparing Stiff Privacy Legislation

DP Users Faced With Regulation

By Edward J. Bride
Of the CW Staff

WASHINGTON, D.C. — The computer community is no longer fit to regulate itself, at least where individual privacy is concerned, according to two cabinet members who pledged last week to make government regulation a reality.

Attorney General Elliot L. Richardson

Other coverage of the HEW Computer Committee report on pages 4-8.

said at a press conference here that the task of determining what limitations should be placed "on the application of computer technology to record-keeping about people" cannot be left "exclusively to those who design and apply the technology."

Accepting the final report of a special government advisory committee, Richardson also said: "We must learn to temper this particular technological application



Caspar Weinberger
... preparing legislation



Willis Ware
... poor safeguards



Elliot Richardson
... standards needed

CW Photos by Edward J. Bride

with sensitive concern for due process and the average citizen's wish to be let alone."

Most of the committee's recommendations concerned methods to safeguard computerized information, although on a broader scale the group also urged Department of Housing, Education and Welfare Secretary Caspar Weinberger to:

- Encourage the development of standards of ethical behavior and professional competence for data processing personnel.
- Help educate the individual citizen regarding his stake in his own personal privacy.
- Monitor the safeguards to determine both their effectiveness, and whether "they are themselves a source of any adverse social consequences."

Richardson's Impetus

The report, entitled "Records, Computers and the Rights of Citizens," is the product of the committee inaugurated by Richardson in late 1971 when he was HEW Secretary.

It was formally known as the Secretary's Advisory Committee on Automated Personal Data Systems (HEW Computer Committee).

The report also recommended federal legislation guaranteeing individuals the right to find out what data is being maintained about them in computerized systems, and to obtain copies on demand.

(Continued on Page 4)

IBM Moves to Bring Ascii, Ebcidic Together by 1974

By E. Drake Lundell Jr.
Of the CW Staff

TULSA, Okla. — Apparently IBM is working on a plan to "bring Ebcidic and Ascii together" by sometime early next year.

That disclosure comes from minutes of the IBM Management Committee meeting contained in documents released at the IBM-Telex trial.

The minutes discuss the formation of a group in the IBM standards strategy task force to develop ways to make the two coding schemes compatible before the introduction of IBM's planned series of Future Systems in 1975 or 1976.

At the same time the minutes of the meeting indicated IBM got into the Ascii-Ebcidic controversy for primarily marketing reasons, with some technical justification for the marketing moves.

The minutes showed that the prime reason for going to the Ebcidic code was because "marketing management desired a code compatible with installed BCD systems."

But the move could be technically justified, according to the minutes, because "at the time of the 360 announcement, Ascii was a 7-bit code with many conventions not defined."

At the same time, the minutes also showed that IBM was worried about setting de facto standards in the industry, something it apparently does every time it announces a new system or product.

Choice Delayed

One of the reasons for not choosing Ascii at the time of the 360 development, the minutes noted, was because "if Ascii had been selected, it would have been a unilateral decision and become a de facto code."

At the same time, the standards strategy group at IBM was given the order to "monitor the development of a strategy to bring Ebcidic and Ascii together by 1974," and was also ordered to provide IBM top management with monthly progress reports on the status of Ascii.

Bank Auditors Do It Themselves--Form DP Group

By Toni Wiseman
Of the CW Staff

ROANOKE, Va. — "What we're trying to do is establish standards, and trying to define our role so that we can look forward in the future to seeing a regulatory guideline in the data processing environment; because right now I think we're flying blind."

That's Neil Jackson's appraisal of the Eastern States' Association of Bank Data Processing Auditors, a newly established group of which he is founder and president.

The role of the banking EDP auditor, as Jackson sees it, is to back up and support the financial auditor in the banking industry who has reliance on the data base — although he doesn't have the expertise to

(Continued on Page 2)

Watergate Computer Has No Bugs Yet

By E. Drake Lundell Jr.
CW Washington Bureau

WASHINGTON, D.C. — The "Watergate Computer" is up and running — and without any apparent bugs.

The "Watergate Computer" is actually a series of computer programs that allow investigators of Sen. Sam Ervin's (D-N.C.) Special Committee on Presidential Campaign Activities to catalog and cross-reference the testimony of the various Nixon Administration officials and others being called to testify on last year's political espionage activities.

While the system cannot do the investigative work for the committee staff, "it is working quite well" and has helped the investigators "quite a bit," according to committee staffer Gene Boyce who is in charge of the system.

The investigative system is presently being run on an IBM 370/155 main-

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EDWARD J. BRIDE, *editor*

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In Snow, Sleet...Tapes, Disks Often Delayed

Post Office Welcomes Competition for DP Deliveries

By E. Drake Lundell Jr.

CW Washington Bureau
WASHINGTON, D.C. The Postal Service

ice has a monopoly in this country on the movement of mail, but DP managers have realized for years that due to delays

and sometimes spotty service, the U.S. mail system has not been the most effective way to transport computer tapes, disks and other materials urgently needed for processing.

As a result it has often resorted to special package delivery for the handling of such material — and now the Postal Service is recognizing the problem and trying to relax its control in this area so that competing "post office-type" firms could enter the business of carrying computer-related materials.

Competition Sought

In a recent report to Congress and the President, the Postal Service reaffirmed its "exclusive right to deliver letter mail" but suggested amendments to its regulations that would permit competition in the area of computer-related and other urgent intercompany communications.

The new regulations would apply to any

mail or other deliveries that require delivery in under 24 hours, and computer tapes, disks and printouts are specifically noted as examples of the type of intercompany communications that would fall under this category.

Suspend Monopoly

The new regulations would suspend the Postal Service's monopoly over the delivery of this type of material and would allow firms to contract with or use other sources of such deliveries if the material is needed within 12 hours at a computer center for processing.

The effect of the regulations is unclear, since many large computer users already use some form of private package or parcel delivery for urgently needed tapes and disks, but it will at least give the Postal Service's seal of approval to the practice.

Calif. County Awards Contract For Facilities Management to CSC

By Marvin Smalheiser

CW West Coast Bureau

SANTA ANA, Calif. — Orange County supervisors last week voted unanimously in favor of a seven-year, \$26 million facilities management contract with Computer Sciences Corp. (CSC).

Although not all the details were worked out, CSC said it was ready to begin work immediately on receipt of a letter of intent.

Orange County is reportedly the first of its size in the nation to give up its own data processing department in favor of facilities management.

In deciding to jettison the county's 200-man data processing department, the supervisors indicated they were motivated by the substantial savings offered by CSC's low bid.

Comparative costs for the seven-year period for the DP department were evaluated at \$37.8 million. A bid by Electronic Data Services was valued at \$41 million.

The agreement will provide for joint ownership of software systems by CSC and the county. CSC is planning an extensive campaign to market the systems and the county will share in the profits.

Some Questions Raised

Before the supervisors voted to accept the contract, a number of questions were raised, including the legality of an outside firm tabulating voting returns.

Marcia Bents, foreman of the county Grand Jury, read a telegram in which a state legislative counsel was said to raise the voting question, but the supervisors said they had considered the point and were willing to test it in court, if necessary.

Ronald W. Casper, chairman of the supervisors, indicated his reluctance to vote in favor of the contract because of what he called "negative" reports about CSC's financial status.

CSC officials said he was apparently referring to the loss reported in CSC's

annual report but they said the report was "very conservative" and Infonet (CSC's time-sharing network) is now profitable.

In voting for the facilities management contract, the supervisors gave CSC the option of using Univac equipment if it would be cheaper, providing the contract cost is then scaled down.

CSC officials said they would decide in the next two weeks whether to use Univac or IBM equipment and will probably take delivery in two to three months.

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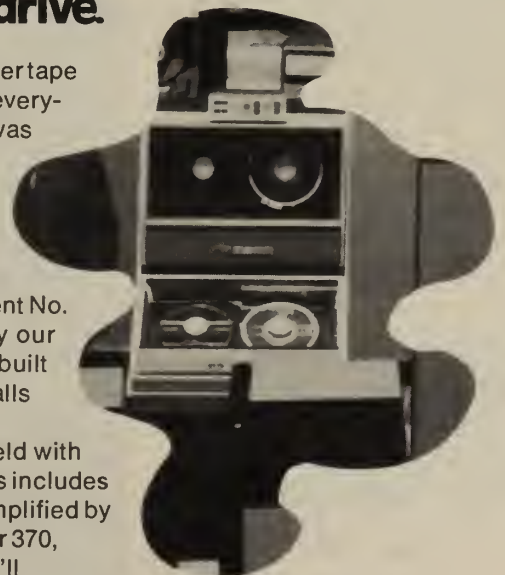
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Stiffer Privacy Law Seen

(Continued from Page 1)

Weinberger said he was prepared to issue guidelines to federal agencies under his (HEW) auspices, implementing this suggestion.

He is also preparing the suggested legislation so that federal, state and local agencies, as well as private concerns, will be obliged to comply with this practice.

Universal Identifier Opposed

As expected, the committee criticized the drift toward making the Social Security Number (SSN) a Standard Universal Identifier (SUI), and further recommended against adoption of any SUI, with or without the SSN, "now or in the near future."

The reason for this position, according to committee chairman Dr. Willis Ware, was "the lack of adequate effective safeguards against potentially harmful computer-based record-keeping practices."

Ware, senior computer scientist at the Rand Corp., explained that unique labeling of individuals in computer systems makes it "more efficient and expedient for data systems to exchange information."

Thus, in principle, he added, "a universal personal identifier invites linking of automated personal data systems and may encourage government agencies and certain types of private organizations to develop dossiers on much of the nation's citizenry."

No Intelligence Data

A specific clause in the report, which was endorsed by Weinberger, would prohibit intelligence data gathering: "There must be no personal data record-keeping systems whose very existence is secret."

One recommendation which could be implemented before the legislation would affect states and many government contractors. The committee's request is for HEW to urge the federal Office of Management and Budget to direct all federal agencies to require their "grantees and contractors" to abide by the suggested safeguards to privacy.

The committee suggested that OMB "prescribe government-wide grant and contract conditions" incorporating the suggestions, just as OMB apparently does now in such areas as "intergovernmental planning and financial management."

The committee acknowledged that this could present some difficulty, at least until there has been some experience in applying the safeguards, and "we would expect to see (HEW) take a lead role in promoting uniform, government-wide safeguard requirements for automated personal data systems of federal grantees and contractors."

The HEW committee also said record-keeping organizations should be required to inform individuals on request of "all uses made of information that is being kept about them in computerized files."

While not suggesting specific means to enforce this provision, Richardson and Weinberger agreed it was a good idea.

The committee also recommended establishment of a new office within HEW to implement and monitor the many other suggestions contained in its report.

Weinberger fell a step short of announcing such a function, though he stressed several times that the substance of the report was good.

Richardson, who acknowledged that one of his departments, the FBI, currently compiles files on suspected organized crime figures, said there might be some problems resolving "social order versus individual liberty, the rationalizing demands of technology versus the humane values of man, personal privacy versus the public's need to know."

He agreed with portions of the report that implied the need for federal standards in criminal data systems

operated by states, particularly those under the operational control of the FBI. He is working on legislation for such standards, he noted.

SUI Debate Needed

On the subject of the SUI, Ware also suggested that the uses and societal consequences of such an identifier had not been publicly debated. Until such debate has been aired, and until safeguards have been legislated, the committee proposed restrictions on the use of the SSN ("limited by law to those purposes that are mandated by federal legislation").

Sources close to the committee acknowledged that implementation of this clause would essentially destroy the system of issuing drivers' licenses in the several states which use the SSN as the driver's license number.

Copies of the full 346-page report are available from the Superintendent of Documents, U.S. Government Printing Office, 20402. Price is \$2.35 post-paid, GPO Stock No. 1700-00116.

Code Promises 'Fair Practice'

WASHINGTON, D.C. — HEW Secretary Caspar Weinberger has accepted and endorsed the HEW Computer Committee's recommendation that a Code of Fair Information Practice should become law.

Weinberger said last week that he was preparing guidelines to implement such a code within HEW, and that he was also drafting legislation to submit to Congress.

Some of the provisions, as outlined in the committee's report:

- The code should define "fair information practice" as adhering to specified safeguards (including prior informed consent of individuals before transfer of data could be done; designation of one person responsible for the system; penalties for violating the code; precautions against "anticipated threats or hazards to the security of the system"; keeping complete records of every access to and use made of any data in the system; assurance of ac-

curacy, completeness, timeliness and pertinence of data; and elimination of data when it is no longer timely).

- Keepers of files must give public notice of the existence and character of the systems at least annually, including the name, nature and purposes of the system, sources of information, uses of data and the identity of the one person responsible for the system.

- Keepers of these systems must inform subjects of individual rights, including whether they are legally required to supply data, and of the specific consequences of refusal; making data fully available to subjects (on request) in comprehensible form; following these guidelines even when data is subpoenaed.

Furthermore, the committee recommended that both civil and criminal penalties should be enforced for unfair information practices, and that injunctions could be granted to prevent violation of any safeguard requirements.

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Report Urges More Study Into DP Impact On Society

WASHINGTON, D.C. — While the major thrust of the HEW Computer Committee was the enactment of legislation and opposition to the establishment of a universal identification system based on the SSN, the group made other recommendations to HEW Secretary Caspar Weinberger.

The group suggested that HEW support research into the use and impact of computers in education, health services delivery, public assistance, juvenile delinquency prevention and community mental health.

Besides encouraging the development of performance standards in DP personnel, the committee encouraged the government to "design and develop computer-based record-keeping systems without reliance on outside specialists."

Finally, the committee said the Federal Government should help the states develop uniform legislation for the Code of Fair Information Practice for all systems that would not be reached by federal legislation.

'Amend Credit Act' To Allow Inspection

WASHINGTON, D.C. — The Fair Credit Reporting Act should be amended to provide for actual, personal inspection by an individual, including the opportunity to copy its contents, the HEW Computer Committee said.

The choice between inspecting and copying should be left to the individual, the committee said in its report.

The committee also recommended that if a doctor feels medical data could be damaging to the patient, then a credit bureau has no business having access to that data.

"It is a disturbing thought that an investigative consumer-reporting agency may have a record of medical information that the individual cannot know about or challenge," the committee said.

The committee therefore recommended

another amendment to the Fair Credit Reporting Act, omitting access to such data.

'And Information Act'

WASHINGTON, D.C. — The HEW Computer Committee has acknowledged that the Freedom of Information act may need to be amended, in order to comply with some of the recommendations in the report on "Records, Computers and the Rights of Citizens."

Federal agencies can currently withhold certain types of information from public disclosure, at the agencies' sole discretion, and the HEW committee wants the individual subjects to have a part in that decision.

They therefore recommended that subjects with data files in the following categories be given such authority:

- Trade secrets, commercial/financial information obtained from a person and deemed privileged or confidential.

- Personnel and medical files
- Investigatory files compiled for law enforcement purposes, except those already available by law.

Spying Discounted

WASHINGTON, D.C. — Attorney General Elliot L. Richardson has claimed ignorance of government spying on civilians during the tenure of John Mitchell.

Taking note of an appendix in the HEW Computer Committee's report, in which it was claimed (without committee comment) that then Attorney General Mitchell encouraged such spying, aided by computers, Richardson said this only applied to organized crime suspects.

Richardson thus eliminated from consideration the charges that the FBI had spied on congressmen or allegedly subversive groups; it had been acknowledged that the U.S. Army conducted intelligence-gathering activities on the latter.

Asked whether he planned to curtail FBI surveillance of civilians, Richardson commented that he was aware only of surveillance of organized crime suspects, and he indicated no plans to diminish this type of activity.

Committee Member To Address ACM '73

ATLANTA — "Computer Records and People" will be the topic of a major presentation before Sigcas at ACM '73, the annual meeting of the Association for Computing Machinery.

The program features Guy H. Dobbs, vice-president for technical development of Xerox Computer Services, who will outline conclusions of the report of the Secretary's Advisory Committee on Automated Personal Data Systems. Dobbs was a member of the committee.

"Computer Records and People" will be open to the public. The presentation is scheduled for 8:00 p.m. Monday, August 27, at ACM '73 conference headquarters in the Regency Hyatt House here.

Computer Goes on Board

DERBY, England — All aboard! A variety of computer equipment is aboard the British Rail's Tribometer Test Train to measure the special qualities of friction necessary to move a train.

Included are a Dynamco Microscan data logger, which is coupled to a paper tape punch and an IBM printer, as well as a Wang 700 programmable calculator for immediate analysis.

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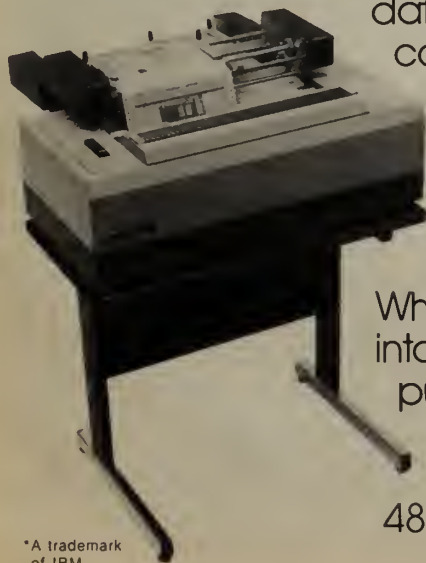
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Opposition to HEW Report Looms on Two Fronts

By Alan Taylor

Special to Computerworld

WASHINGTON, D.C. — The HEW committee report recommends immediate legal action to halt, or impede, the association and combination of records on the same individual from different data banks. But getting widespread endorsement of the committee's findings may not be easy, because there may be major opposition on two fronts — efficiency and privacy.

The Efficiency Front is centered around a proposed standard by the ANS X3 Committee. The standard — Identification of Individuals for Information Exchange — faced the question and listed the pros and cons of having a unique individual identifier, and neatly did away with most of the major arguments against a UID on the grounds of efficiency.

The Privacy Front, on the other hand, is presently centered around Sen. Samuel J. Ervin Jr. (D-N.C.) and the Senate Subcommittee on Constitutional Rights. The Ervin forces maintain that the whole question of using a UID at all is not a technically oriented question. It is a question best decided by a thorough investigation and analysis of the rights of individuals to privacy — rights defined by the Constitution, common law and state constitutions and statutes.

It's Congress' Decision--Ervin

"I believe that the ANS X3 Committee members may wish to refrain from making for the American society a vitally substantive decision which by rights ought to be made by legislative bodies, only after extensive public debate on the subject."

These remarks, addressed by a then comparatively unknown senator, Samuel J. Ervin Jr. (D-N.C.), to the ANS X3 Committee on Jan. 19, 1972, halted the standardization process which was aimed at implementing the Social Security Number as a universal identifier.

That unknown senator is now one of the most famous lawyers/legislators in the U.S., and what he saw then as an objection to the standard then proposed may yet apply with perhaps equal force to the hurried implementation of the HEW committee recommendations.

The senator's office confirmed last week that Ervin has no doubts at all that the individual's private rights are presently being abused, and that action will soon be needed. A spokeswoman broke down the area of rights — an individual's rights compared with the government's rights, and the separate rights compared with those of another individual.

Ervin himself will be contributing to the debate as soon as possible, his office stated. Ervin is very interested in the matter, and has sent for an advance copy of the HEW report so that his contributions will not be long delayed.

The spokeswoman pointed out that there had been a number of developments since Ervin had written his original letter to the ANS Committee, specifically in California, Texas and New York, which showed that the debate that Ervin had

called for was now in operation.

In the Texas case, a common law right to privacy has been acknowledged by the state Supreme Court. This holds that a person can be made accountable for the results of prying into other people's affairs. In California, a right of privacy is incorporated into the state constitution, while in New York a state law controls the uses for which information can be disclosed — such as requiring that a photographer obtain the consent of the person photographed before distributing the photo.

Right of Privacy

"Right of privacy" can be a misleading term. But four separate rights have been partially recognized:

- **The U.S. Constitutional Right** — The Constitution protects the rights of the individual from governmental abuse.

Ervin believes that abuses of this right are occurring in current and proposed governmental data systems.

- **The Common Law Right** — Common law rights are valid legal rights even though they are not written down.

- **State Constitutional Rights** — During the 1972 elections California adopted for its citizens the State Right of Privacy. Legislative history on the proposal indicates it was intended to provide controls over abuses of automated systems.

- **Various Statute Rights** — Statutes passed by the federal or state legislators can also give rise to specific rights of privacy. A federal example is the Fair Credit Reporting Act, which defines that an individual must have access to files concerning himself, and the New York

(Continued on Page 8)

ANS Maintains Efficiency Issue

The ANS X3 Committee did, in 1971, consider some of the social objections that could be raised against the use of a UID, and gave reasons for rejecting these objections:

• Invasion of Privacy

The invasion of privacy issue, the ANS X3 Committee said, is frequently used to imply all such [data bank] interchange is harmful or undesirable. Desirable interchange should not be economically or legally penalized as a way of stopping undesirable interchange.

Disclosure Vital

The area to be controlled, the committee argued, is not the interchange, but the subsequent disclosure. Therefore the single unique identifier, being technically useful in the interchange, should be adopted; and penalties and safeguards should be designed to operate at the

output end of the system, rather than deal with the system itself.

• Can Laws Alone Insure Privacy?

Concerning the control method it had in mind, the ANS Committee again appears to be at odds with the HEW committee. While the HEW committee report calls for legal action, the X3 Draft Standard argued that legal restrictions against the abuse of information — such as unauthorized disclosure — would be impractical and probably unenforceable.

If the legal control was sufficiently tight to make it enforceable, then it would create an inflexible system which would be impractical, with unnecessary expense and waste, and which might inhibit technology.

In place of legal control, the responsibility for controlling improper disclosure is placed, in the Draft Standard, on the

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Programmed Extractions, Evaluations

Processing Volume Would Jump

HEW Report Guides Could Usher in 'Electronic Privacy'

By Alan Taylor

Special to Computerworld

Data processing would look very different if the HEW report recommendations were adopted. Data files would have to be accompanied probably by individualized records indicating — on a field-by-field basis — just where the information was derived, and for exactly what stated purpose it was collected.

Other new file content would also be needed to define any further uses that had been authorized by the person concerned — to obtain his "informed approval."

All this additional data would have to be held with the individual's record, perhaps in the form of a "trailer" appended to it. And, naturally, there would be a file record examination program, which would provide copies of the data itself.

Whenever such a record was being processed, it would remain the responsibility of the DP operation to ensure that the

data used was *only* used for the approved purpose.

This would seem to make it practically impossible to simply continue to provide data banks with copies of records — even with the trailer record — as to how the

Analysis: A Look Ahead

information had been gathered.

Data banks inevitably lead to the leakage of personal records, which is what the HEW committee has specifically maintained should not happen. The responsibility may then flow directly to the DP departments of every major user.

Real-Time Methods

One method might be particularly appropriate for real-time applications, such as credit approvals. Here, new programming techniques would examine the de-

tails in "electronic privacy" — i.e., providing for a programmed extraction and evaluation of relevant material, the programmed development of a recommendation with regard to the approval and the programmed transmission of the recommendation, rather than the data itself.

Data from the record itself would thus be kept completely private — and would reach human eyes only if the recommendation was not only not accepted, but also was challenged.

Thus, where the information suggested that a credit request be turned down, the requestor would either accept the turn-down or access the record itself before permitting any actual data to be seen by anyone.

The concept of using "electronic privacy" is analogous to the use of rating systems, such as the Dun and Bradstreet rating for municipal bonds. ("A-1" at Lloyds of London, etc.). In these cases

most approvals or decisions are based on the fact that a rating has been given, without explaining why the decision has been made.

An "electronic privacy" system would initially increase the amount of processing of data, at least until standard types of inquiry are developed.

Two other possible new procedures might have to be adopted — the "forgetfulness" run, and the "information leakage detection" testing.

Files gathered for approved purposes could become expensive to hold, particularly if they were to be held in careful security. To reduce costs, and to reduce the dangers of unauthorized leakage, periodic prunings of the data would probably take place, thus ensuring that a file for credit-approval use is not cluttered with details of school grades — even though these might have been important in the first months, after the record was initiated.

In addition, periodic testing of the amount of information actually being held (for instance, is an employer refusal to give a reference actually negative information?), as opposed to the data description listed, may also be needed.

Efficiency Front Led by ANS Board

(Continued from Page 6)

users of the formats — i.e., the individual computer centers — who are told to take "great care" to prevent unauthorized disclosures or release of information.

In favor of a unique identifier the ANS Committee argument ran as follows:

1. Much interchange of data from individual files is legally established and politically or socially acceptable. Indeed, interchange is a necessity of modern life.

2. Most DP systems require information about people from outside sources — particularly from other systems.

3. Reducing the cost of interchange is desirable because of the great volume of interchange that will take place — as most DP systems will be involved in interchanging. This will help socially accepted interchanges to operate better.

3a. Improving the accuracy of identification is desirable because of the serious consequences of misidentification, particularly to the individual.

4. Use of a unique yet personal individual identifier provides for both these desirable characteristics (reducing interchange cost through reduced volume of transmissions, and at the same time reducing misidentifications) and therefore should be adopted unless there is some specific overriding reason against it.

Ervin Takes a Stand

(Continued from Page 6)

State law is another example.

The recent developments since Ervin called for a delay in the standardization process, include the Texas and California cases previously noted, and a definition of the right of privacy given in the Supreme Court by Justice Harry A. Blackmun at the time the various anti-abortion laws were struck down. He wrote, "The right of privacy is broad enough to encompass a woman's decision whether or not to terminate her pregnancy."

Heat Waves Hit Computer

PASADENA, Calif. — Sun and heat can cause mirages in the middle of the desert, but in a sheriff's station?

Deputies at the Altadena station viewed several minutes of unscheduled random symbols, letters and odd shapes on the video screen of their information computer.

The reason, discovered later, was a power surge caused by a transformer blowup in nearby Altadena.

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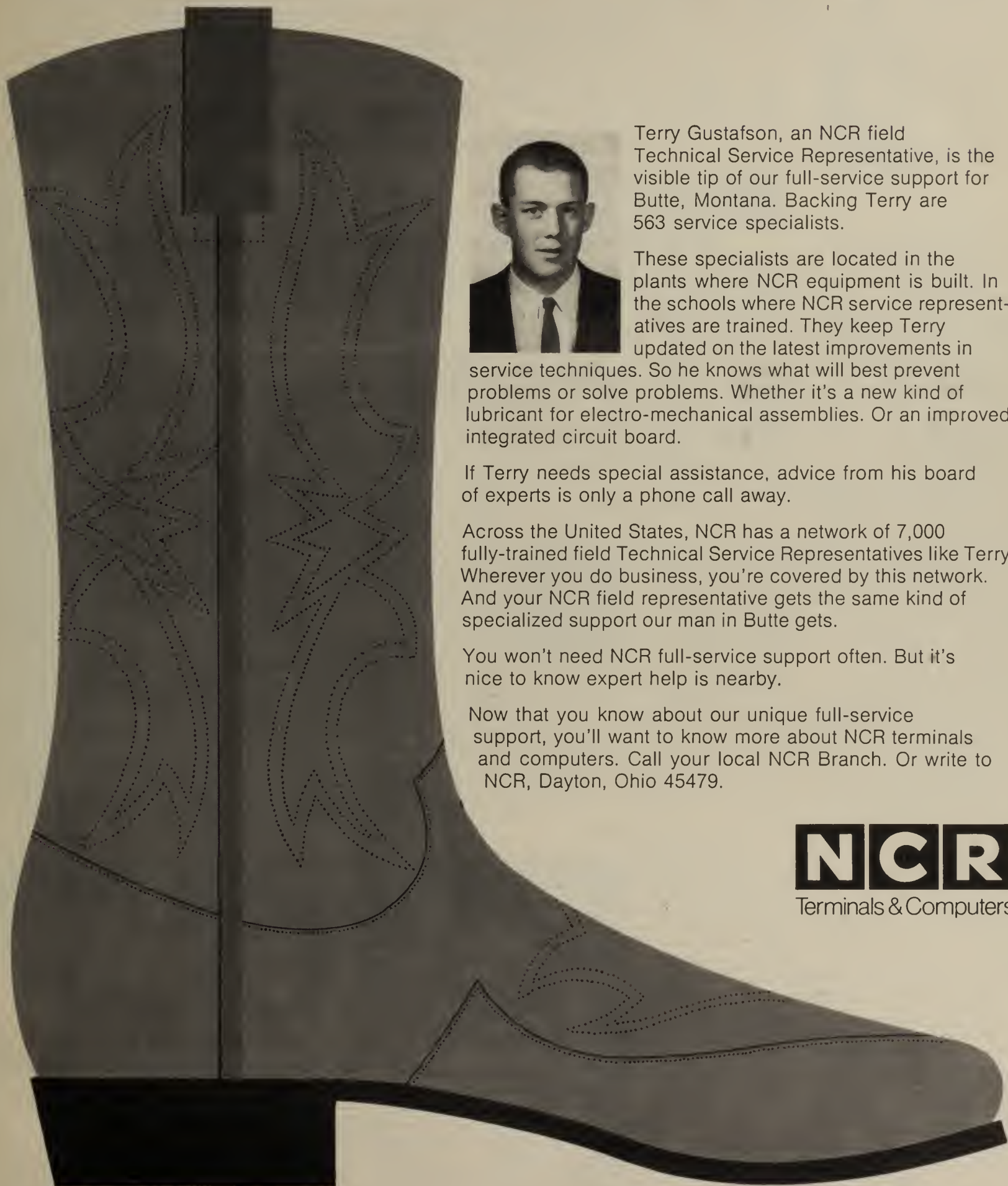
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Terminals & Computers

Open Letter to HEW Secretary -- Part I

Prevention of Information Abuses Now Needs Study

Dear Secretary Weinberger,

Yesterday, when you left the Snow Room press conference room at the Department of Health, Education and Welfare and the TV lights at around 11:40 did you really think you had coped with the problems of information abuse — or even made a good start?

I think you felt that by admitting some of your systems were inadequate, and stating that legislation to implement findings from the HEW Advisory Committee was already in preparation and would be presented in October, you had done all that was necessary.

I cannot agree with you — nor does my wife, Heather. We feel that while some emergency legislation may in fact be necessary, it should be formulated after appropriate hearings which face up to the real facts of the situation. Not by a flurry of hasty action taken by a single department, not even by HEW.

I won't bother you with a long history of information abuses — but confine myself to talking about things that have occurred in Heather's life in the past 24 hours. Then, as point after point of apparent information abuse occurs, I shall ask you whether the treatment of this style of abuse is within your experts' knowledge and capabilities to correct, and intentions to correct.

If the answer is "yes", then I ask you to publish these most desirable answers rather than hoarding them in your department. If the answer is "no", then I suggest that a full conference on information abuses and their prevention be called forthwith.

That is something the department could do most appropriately, and it would be a great deal more effective than the bandaid approach to information abuse that seems to be your current intention.

Safeguards Dismantled

When you started talking that day, Heather was at home in Massachusetts somewhat worried by the fog forecasts. She knew I had arrived safely in Washington — even though the American Airlines flight 415 was hours late.

She comforted herself by the assumption that Logan Airport in Boston, from where I had taken off was a highly technically supported system, even though Washington National (my destination) might not be.

How wrong she was. Logan Airport did not even know what was happening on the field itself since as a part of its development it had disconnected the electronic surface scanners months before. Now it was operating blind and risking people's lives.

Was this an example of information abuse, Mr. Secretary? Should Heather and others not have been told when some technical decision was made to withdraw safeguards to systems? Have your technicians faced this type of problem yet? Or do they think that dismantling safeguards is not a matter that should concern the public? (Naturally, your technicians were not involved in the Boston tragedy itself, but the problem is a general one.)

Just about the time you stopped speaking in the Snow Room, a Delta Airlines plane crashed into a wall and burned. Right on the runway. Truck driver, Geoff Keating was out there by luck — but his "Mayday, Mayday" on the truck radio went unheard. His radio had been out of commission for months.

Was this an example of information abuse, Mr. Secretary? Are Heather and others not entitled to know that maintenance

upon which lives depended while you were at the Snow Room podium had not been performed? Have your technicians faced that problem yet? Or do they think that actual performance of maintenance is not a matter that should concern the public?

Professionals Keep Mum

Two minutes after the crash, however, someone in radio contact with the tower did see it. A highly skilled professional pilot bringing another plane in. But he did

not (to avoid panic) was non-operative. Heather could only obtain information over the radio — not from official sources.

Was not this an example of information abuse, Mr. Secretary? Are people not entitled to know the true facts from official sources when disaster has struck? Or is misinformation allowable even when it is not believed? Have your technicians studied this problem, or do they believe that people have a right to give out misinformation in such circumstances.

Was this not an example of information abuse, Mr. Secretary? American Airlines in Boston is NOT American Airlines in Providence — so why should it be so labeled? Have your technicians faced this problem yet? Or do they think that incorrect labeling will not matter to others if it does not matter to them?

Contacting some senior American Airlines official, Heather was told that the record of who was on the plane — the manifest — was itself on the plane, and therefore American Airlines could not know whether I actually caught the plane.

Was not this an example of information abuse, Mr. Secretary? American Airlines had other means of telling who was on the plane. The tickets themselves, for instance, at National Airport had this information. Was not this an example of information abuse Mr. Secretary? The official must have known the presence of the manifest on the plane was totally irrelevant to the question he was purporting to answer. Have your technicians faced the problem of irrelevant responses yet? Or do they think irrelevant responses are alright to give to inquirers?

Hours later, when I still had not contacted home (I was in a bus driving non-stop to Logan) my 13-year old daughter Alison tried to find out whether I was safe — or lying unconscious anywhere between Washington and Boston. She was told by American Airlines that she could not be told whether her father had been on the plane because this is forbidden by law.

Does such a law exist, Mr. Secretary? If it does, is the law itself an example of information abuse? If it does not, should the use of false excuses about legal matters be considered a matter of information abuse? Have your technicians faced this problem yet? Or do they think taking the name of the law in vain is all right?

None of these points are irrelevant to data processing and to the rights of people, Mr. Secretary. I heard you talk about the need to stop abusing people in the billing operations — but laws should not simply be made to fit single areas.

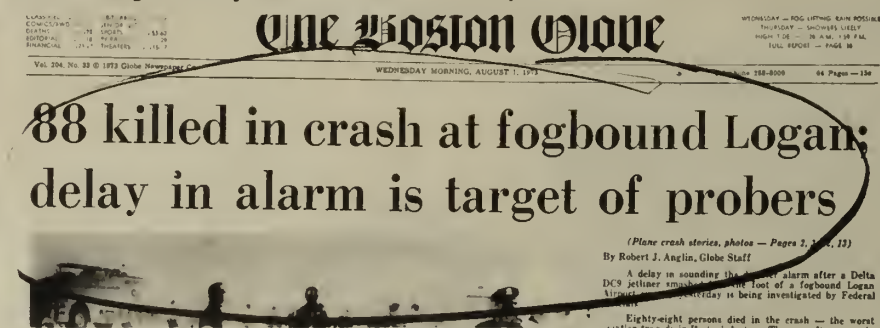
Billing as currently practiced is awful — but it does not stand alone. Nor are personal data systems the only ones that affect people.

Perhaps now you will believe me when I say that your response to the situation, given in the Snow Room, does not strike me as adequate. We need a conference to bring matters into the open. Information abuse cannot be covered up with a curtain in the same way the Snow Room mural was covered up while you were speaking and others were dying.

Very Truly Yours,
Alan Taylor

The Taylor Report By

Alan Taylor, CDP



Headline describes air tragedy at Boston's Logan Airport.

not tell the tower about the crash. He merely said he was not landing in his turn. Two minutes later another plane followed his example.

Was this not an example of information abuse, Mr. Secretary? Are Heather and the others not entitled to know that professionals will keep vital information to themselves — and that no code of ethics makes them report dangerous events? Have your technicians faced this type of problem yet? Or do they think that ethical codes of conduct should be left to the information technicians themselves?

Missing Data Ignored

The tower by now should have received an "arrived safely" signal from the aircraft. It did not. But it continued to order planes to land on the runway it could not see. The tower acted as though the absence of expected data was not enough to trigger action. In fact it appears that the tower did not know for 13 minutes that a plane had crashed on the only runway in use.

Was not this an example of information abuse, Mr. Secretary? Are Heather and other people not entitled to expect professionals to use data absence, as well as positive data, to trigger systems designed to shield people? Have your technicians faced this type of problem yet? Or do they think that missing data does not matter.

Incorrect Info 'To Avoid Panic'

At the airport, the public address system and ticket agents claimed that delays and flight cancellations were due to fog — and did not admit officially that a crash had occurred for at least two hours. In fact, the people in the terminal knew almost immediately, so that the official reason for providing incorrect information

Later, however, I took off from Washington for Logan on American Airlines flight 226. The plane was late, was diverted to Providence, R.I., and the passengers — directed by an anonymous voice over an intercom — were rushed through baggage and onto busses that took off without counting passengers, or giving anyone any time to contact people already worried over the constantly unfolding story of airport chaos in Boston.

Was this an example of information abuse, Mr. Secretary? Are special measures not appropriate to relieve peoples reasonable sudden anxieties in the face of discovered unreliability? Have your technicians faced this problem yet? Or do they think that anxiety hurts no one, and that the final production of a correct answer is all that can be asked of them?

American Airlines Flight 226 was supposed to land at 7:15, the airline information service told Heather. Half-an-hour later they told her it had landed in Providence, and the airline was trying to find busses to bring the passengers to Boston. They may have been correct — but we passengers were parked on an unused runway, not in the terminal. Heather could not see why I did not phone home — and started worrying.

Was this not an example of information failure — or information abuse, Mr. Secretary? If passengers are being kept isolated and away from contacts is this not important information that relatives have a right to know? Have your technicians faced this type of problem yet? Or do they think that nothing not in the standard data record can matter to others, even if not to themselves?

Attempting to find out what had happened to me, Heather tried to call American Airlines in Providence. The calls were answered by American Airlines in Boston — which knew nothing!

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Our August 29th Storage Supplement will look at a variety of alternatives to more efficient storage, including articles on:

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Editorial

Lasting Social Issues

The HEW committee report will be the focus of much *Computerworld* attention in the coming months.

We believe that its recommendations, whether implemented or not, give important direction to data processing applications people here and in other countries.

We believe discussion by the American public of the human rights and personal privacy issues, *versus* the economic and governmental efficiency that more mechanization always promises, can be aided by the user community, the professional societies and CW.

And we believe that media attention will encourage the administration to take positive action, even if not entirely favorable, on this extremely important document.

Letters to the Editor

Poet Defends Hopper; 'Reactions Are Proper'

Re "Cobol Standard Your Responsibility, Grace Hopper" [CW, June 27]:

A remarkable grace has Grace Hopper,

And blasts from A. Taylor can't top her.

She's been blasted before,
But comes back for more;
Her reactions are seldom improper.

Richard M. Petersen
Scottsdale, Ariz.

Burroughs Power

Regarding the article on the System/3 by Stanley J. Cloward where he discusses the attributes of the S/3 and states, "We have reviewed the stables of other vendors and found them to be somewhat lacking" [CW, Special Report, June 27].

Perhaps the Burroughs B1700 was out grazing in the west 40 when he walked through. This system offers significant technological advantages over the S/3. In addition, Burroughs has announced an S/3 Emulator.

About the only thing lacking at the moment is the realization by the Burroughs marketing people

about the powerful system that their designers hath wrought.

Charles M. Dye
Director of MIS
Coronet Industries, Inc.
Dalton, Ga.

'We Do It'

George Bernstein was reported to have stated, at an NCC session concerning "Views of the Future," [CW, June 13] that no firm is yet marketing equipment which can accomplish word processing and data entry tasks and which also incorporates communications abilities.

For the past two years we have been delivering combination systems; systems which he described as being currently unavailable.

Christopher L. Freitas
Director of Communications
Eldorado Computer Corp.
Concord, Calif.

A user of another supplier's [General Computer Systems] combination system also invited our attention to Bernstein's comments, which were undoubtedly prepared several months prior to their delivery. Ed.

(Other letters, viewpoints on pages 12, 14)

Why Not a UID?

One issue in the HEW report is quite familiar. I've grappled with it personally in speeches about my Fort Knox concept: the idea that we should lock up *all* the data about our citizens in one place and watch it like, well, our gold bars!

That issue is whether or not to have a universal identifier for every American — a unique number, assigned at birth or admission to the country, the use of which would be required by law, regulation or custom in almost every transaction.

Such a number would replace the ridiculous multiplicity we now struggle with (social security, driver's license, armed forces, credit cards and, some day soon, telephone numbers!).

I need not rehash the argument: the advantages usually listed are economic, and that quite properly concerns systems analysts and installation managers, software houses, and — at one remove — hardware suppliers.

My view is that on those grounds, economy and efficiency, the concept ought to be rejected. Human values are more important.

But there are human-values arguments

on the other side also, and one is overwhelmingly important. This is the matter of erroneous identification. It's not too important for me: there aren't any other Herbert Reuben John Grosches worldwide (all right, I *heard* you!). But for William NMN (no middle name) Johnson,

From the Editorial Director

the fact that there are literally thousands of other Bill Johnsons in the police, credit, reservations networks is very serious indeed.

We are going to keep and expand mechanized records. Bill Johnson will be misidentified, often very painfully. It is hard to persuade network operators to disentangle and correct blunders. I therefore believe that in this one area the libertarians are wrong, and that we should have a unique, computerizable identification.

Herb Grosch

For the Would-Be Manager... Here's A Short Do-It-Yourself Package in 4 Steps

Necessity is indeed the mother of invention. So, if you have to become a manager overnight, you can train yourself inexpensively and fast.

Assuming that you do not have to learn the technical, EDP side of your job (i.e., assuming that you can concentrate on improving your management skills), and that you badly need to acquire management skills instantly, you can train yourself for a cash outlay of well under \$100.

This cheap, do-it-yourself program requires only that you carefully read four books and concurrently practice what you learn.

Management

By Frank Greenwood, PhD



The four basic concepts of the program are:

First, you need to understand yourself... then you can manage yourself. When you can manage yourself, you can manage others.

Second, to manage others effectively, you need to know the fundamental management process.

Third and fourth, you want to master your two most important tools for improving your management performance: management by objectives (MBO) and selling your ideas.

Accordingly, the first book is James and Jongeward, *Born to Win* (Addison-Wesley, 1971). Your self-understanding is helped by its ideas, the most important of which is that your mind can be viewed as having two historical files (parent and child) and one master control program (adult).

This program collects input, tests reality, estimates probabilities and outputs decisions. For example, input from your parent file has to be tested for prejudices (e.g., Protestants can't be trusted) and data from your child file — often input as emotional positions — has to be tested for reality (e.g., Does the world owe me a living?).

As you patch, test and debug your adult master control program, you improve your effectiveness and increase your chances for successfully managing yourself and others.

The second book is Bower, *The Will to Manage* (McGraw-Hill, 1966). Drawing on over 30 years' experience as a management consultant, Marvin Bower concentrates on the basic, well-known managing process which has proved powerful and effective.

If you have been a programmer, or an operator, or an analyst and are suddenly thrust into a "lead" position, you are in a new ballgame. There is no way you can do all the work yourself, so you have to learn how to get it done through others. Man-

agement is the distinct activity of getting things done through others.

The third publication is Varney, *Management by Objectives* (The Dartnell Corporation, 4660 Ravenswood Ave., Chicago, Ill., 60640, 1971).

MBO's main concept is that the clearer idea you have of what you want to accomplish, the better your chances of doing it. It improves management. Planning is better and more useful and control tends to be self-control rather than boss control.

To succeed with MBO, you must believe most people want very much to do their jobs well; their work is the way most people express themselves; and they are highly committed to it.

For example, if you trust your programmers, they will do their jobs. In contrast, if you specify exactly what to do when assigning a new program and then constantly check on progress, your programmers may not perform as well.

Accordingly, MBO is tough on you. Along with the normal problems that go with any new job, you now have the insecurity that you are the hostage of your programmers. Since your performance now depends on them, and because your wisest course is to trust them to meet their objectives, you will have some anxieties.

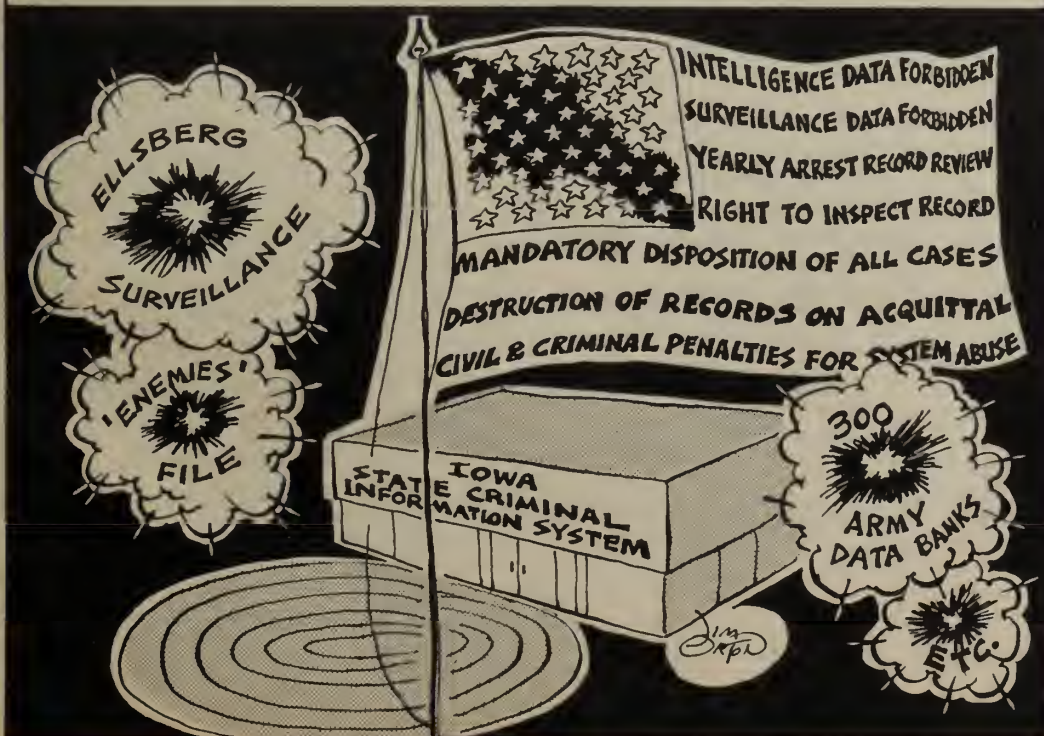
The fourth publication is Edlund, *There IS a Better Way to Sell* (American Management Association, 1973).

The Salesman

You need to sell your ideas to your subordinates, to your customers, to your boss and to almost everyone you deal with. Therefore, selling is a very important tool for you to master.

Computer users, for example, have to see how they can benefit from your ideas before they can accept them. You must, therefore, know their needs intimately so you can determine what you can do for them. Then, you persuade them on the basis of these benefits.

The Flag Is Still There



ACM Publications Need Contributors, Not Critics

By Eric A. Weiss

Special to Computerworld

By quoting out of context some of my remarks made at the Member-Officer forum at the National Computer Conference, my words have been sensationalized by Joseph Rigo to support his thesis that the ACM publications do not serve its members [CW, July 11].

While admitting that the Association for Computing Machinery does not serve its members perfectly, I would like the opportunity to put my remarks about ACM publications into print so your readers may appreciate the full complexity of the situation.

The diversity of ACM membership and interests is matched to some extent by the diversity of its publications, each of which has its own purpose, its own readership and its own character.

The oldest periodical of the ACM, the *Journal of the ACM*, publishes scholarly papers which are rigorously judged before publication. About one-fourth of the

manuscripts submitted are accepted.

It is a journal of record and on the basis of citations is the leading scholarly journal in the computing field. Its content is intended to reflect new knowledge of importance. Its authors are the leading practitioners in the field and they are writing for their peers.

The *Journal* stands in the tradition of the first scientific publications of the late 17th century which substituted for and

Viewpoint

extended the range of personal correspondence among scientists. In this tradition there is a general expectation that if you are capable of understanding and using the *Journal* you are capable of contributing to it.

It was in this context that I made my shorthand comment that Rigo quoted, that the *Journal*, like all leading scientific journals of record, is published for its

authors.

One of the facts of scientific and technical publication is that persons in the academic community are rewarded for publishing in prestigious journals whereas persons in the commercial world are not so rewarded and are often impeded from publishing. Consequently, it is easier to obtain a paper with an academic flavor, possibly even a revised dissertation, than it is to obtain a high quality paper concerning some business, commercial or real-life engineering applications. All scientific, mathematical and engineering journals are subject to this same limitation.

The organizations which have succeeded in generating well-written articles of general appeal to the membership and of respectable technical content (although not presenting new knowledge), have done so by employing full-time staffs of technical writers. The examples which come to mind are *Science*, *Physics Today* and *Spectrum*. [all published by technical societies. Ed.]

To support such magazines and their necessary paid staff requires a larger and more financially successful society than ACM is today. *Computing Surveys* is ACM's attempt to do this without a paid writing staff. It has certainly been successful in terms of its circulation — 22,000.

My basic point is that members who look on their ACM membership as simply a convenient way to subscribe to the journals and nothing more are missing the point of the society, the point of their membership and substantial opportunities. No one should be a member of ACM without also being a member of at least one special interest group or his local chapter.

No member of ACM should limit his ACM activities to reading the publications. He should participate in society activities and he should attempt to contribute to its literature.

Those who complain that articles do not lie in their field of interest should attempt to generate an article which does cover their field of interest.

Eric A. Weiss is former chairman, ACM Publications Board.

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Letters to the Editor

Fuller Gets Credit For DP Voting Idea

Your editorial on July 4 and the letter by Gloria Guggino concerning the idea of "Democracy by Computer" implied that this is a new controversial idea which may make democracy a reality.

You also expressed doubt that America wants or can survive under such a democracy to wit: "Does 'John Q. Public' have the time or interest . . ."

The justification for such a democratic experiment was well stated in an article entitled "No More Second-Hand God" written by Buckminster Fuller, in April 1940.

This article, which gives numerous good reasons why America *must* try "electrified voting" can be found in the book of the same name published by Doubleday & Co., Inc.

Perhaps you should reprint the parts of this article pertinent to this subject.

Don Weidenweber
Sales Representative

Computer Leasing Co.
Portland, Ore.

For democracy to work effectively it "must be structurally modernized, must be mechanically implemented, to give it a one-individual-to-another speed and spontaneity of reaction commensurate with the speed and scope of broadcast news, now worldwide in seconds," Fuller wrote.

Fuller's argument contended that with the advent of new mechanical developments "the cumulative production of human events within a four-year administration is now equivalent of the events of a 400-year pre-industrial dynasty."

To keep man in control of technology Fuller argued for a "mechanical means for nationwide voting . . . Then — I assure you, will democracy 'be saved' — indeed exist — for the first time in history."

One of his major arguments for installing the on-line system was the feeling of unity it would bring to the American people through an awareness "that they personally have taken the responsibility for the course," taken by their society as a social unit.

Fuller's supporters state his ideas are both viable and useful, but they like the ideas of many who wanted change, have been classified as "for academics only" and shoved off to the back shelves of libraries. Ed.

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Who Were the Real Pioneers, Memorex or Its Users?

By Edward J. Bride
Of the CW Staff

The computer community, as well as other fields, has long been the subject of a rather perverted rule-of-thumb: You can always tell the pioneers, since they're the ones with arrows in their backs.

Viewpoint

It's perverted because it implies that pioneers were the "good guys," that they had some business being where they were, and their treatment of the true occupants of the "pioneered" land was justified in the name of progress.

One can't help but wonder whether the Memorex computer scientists and salesmen were "pioneers" in this sense of the word, or if, in fact, the Memorex computer users were the "pioneers."

Did Memorex belong in the computer business? Was there a need for another mainframe company? Did it have the marketing skills? The technical reputation? The support organization needed?

Or were the users the pioneers? They supposedly were forewarned about the problems of survival, yet some of the users thought they had enough technical expertise to take the risk. After all (they must have surmised), the product was a good one, and could serve a useful purpose.

Is this a sensible attitude for computer users? Is their current state of uncertainty (no computer company seems to want the "Memorex user base") the equivalent of arrows in their backs?

Lurking Shadows

The problem could be more significant, of course, for the rest of the computer industry. For in preaching superiority of products, cost savings, etc., the independent suppliers have always had to contend with shadows lurking in the bushes: IBM support for its users. IBM financial viability. IBM ubiquitousness.

The lesson is a difficult one, though certainly not a new one. Know the company, as well as its products, before com-

mitting yourself to a computer acquisition.

Now that the "pioneers" know where they are, however, they must face another difficult decision. Must they all turn to one supplier to rescue them? Is

help on the way? Is Singer or Control Data going to become the Cavalry?

Univac saved the RCA users, but after a long period of uncertainty. The Memorex users are far fewer in number, and their plight is therefore more difficult.

Letters to the Editor

'Virtues' of Virtual Memory Not Always for the Best

Regarding statements made by Prof. Peter Denning in "Memory Management More Critical in Virtual System" [CW, July 11]:

Among the expressions of the virtues of virtual memory, the figure of 50% of total coding time spent on overlay logic for a real memory program pops up. Experience (real, vicarious and virtual) has shown that modular/overlay programming often decreases coding time and

always decreases debugging time in the hands of a skillful programmer.

The only way the 50% figure is understandable is if the programmers involved were unfamiliar with the program they were chopping up and overlaying and/or they were unfamiliar with overlaying techniques.

Maybe this is an intrinsic characteristic of the field, but as advances are made in computing machinery and software, the level of competence required to use the available tools keeps dropping (what other profession can make this boast?).

With VM, one can only shudder at the monstrosities turned out by the new breed of "coding gorilla" freed from size but bound by locality (anti-subroutining) considerations. Perhaps this will be the persuasive argument against we who desire professional status.

Ronald J. Romanczuk

Oneida, N.Y.

More on DP Auditors

Some of the quotations might be misleading to those not actually present at the NCC session on "The Auditor's Interface With EDP Systems" [CW, June 13].

For example, Tom Samson was quoted as saying that the audit effort is reduced in its effectiveness when a visible audit trail does not exist. Actually, in his prepared text, Samson stated: "In place of the documentary evidence left as a result of manual procedures, the auditor may find only an elusive machine-readable audit trail which is temporary in nature."

"Not only does this present the auditor with difficulty in following the audit trail, it also opens the opportunity for individuals to alter the accounting records without evidence that the alteration has occurred."

Samson also stated: "... the auditor may find that portions of the audit trail exist only in machine-readable form. This may require him to utilize the computer to review the contents of the audit trail and perform his audit procedures."

"While some auditors contend this is a disadvantage, I believe it is an advantage since it offers the auditor an opportunity to utilize the power of the computer in performing his audit procedures."

Noel Zakim, Manager
Practice Applications

American Institute of
Certified Public Accountants
New York, N.Y.

Cobol Vs. RPG? Bah, Humbug!

I have grown tired of programmers proclaiming one language is more efficient than another.

Cobol versus RPG — bah humbug! Let's face it, most computer installations are far overstaffed and have installed more hardware than is necessary for what is being produced.

Many highly sophisticated systems installed in small-medium sized companies could be replaced effectively by a terminal that utilizes packaged programs and fewer programmers. The argument of efficiency and time saving is a farce as most of these installations would have time to burn if anyone would analyze the benefits of what they are doing and make a serious attempt to eliminate the fat. Cobol programmers ought to wake up and learn RPG.

With the combination of RPG and Cobol they would save their companies a fortune and actually become more productive employees.

Richard F. Loschetter

Oak Lawn, Ill.

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Dennis G. Sisco—Marketing Manager

Random Notes

Honeywell, Burroughs CPUs Can Use 'Cars 2' Versions

EAST ORANGE, N.J. — The Cars 2 audit reporting software from Computer Audit Systems Inc. has been adapted to run on Honeywell 6000, Burroughs B 3500 and B 6700 series mainframes as well as IBM 360s and 370s, the software house said.

Written in ANS Cobol, the package requires 48K bytes or characters of storage on most third generation equipment. Able to generate 11 reports per pass, it is available for \$10,500, or \$325/mo, from 725 Park Ave., 07017.

Com-Share Adds Analysis Tool For Time Series Forecasting

ANN ARBOR, Mich. — Accufor, a forecasting method and analytic tool now available on Com-Share's Commander II remote computing network, produces detailed reports, in tabular or plotted format, of a company's past history and extension into the future.

Using modified regression analysis, the system develops a seasonal index and relates seasonality to trends, based on a single time series of three years past data. Accufor was developed by STS, Inc., St. Louis.

Com-Share is based at 2395 Huron Parkway, 48106.

New Source of Census Data Provides Tapes or Printout

ITHACA, N.Y. — Sample census data at the Block Group/Enumeration District level, averaging 275 households and 825 people, for any part of the country is available on magnetic tape or paper printout from National Planning Data Corp.

The information was collected through successively more detailed questionnaires addressed to 20%, 15% and 5% of all U.S. households during the 1970 census, but no individual household information is discernable. Mag tape output costs about \$100/reel depending on the number of areas summarized and the complexity of the search keys used, a spokesman said from 20 Terrace Hill, 14850.

Service Plots Metal Forming

LA JOLLA, Calif. — A simulation technique that predicts the results of explosive forming of metal structures has been developed and is available as a service from Systems, Science and Software, P.O. Box 1620, 92037. Users describe to the vendor the process they have in mind.

A structural response program run on the company's Univac 1108 simulates the elastic/plastic behavior of the material, the collisions between sections of metal, and the explosive loading. Output is plotted on a CRT display unit to show the precise position of the structure over time.

Not Just 'Pie in the Sky'

APL Program Swapping Backed by Suny

By Don Leavitt
Of the CW Staff

BINGHAMTON, N.Y. — There's a new project underway at the local branch of the State University of New York, and it sounds "as corny as Kansas in August... as normal as blueberry pie." But in this case it's APL/PIE. The people in the computer center at Suny-Binghamton have set up a clearinghouse for APL and they just couldn't resist the acronym made possible by calling the project the APL Program and Information Exchange.

Despite the cuteness of its name, however, the project has a simple and useful goal. Installations that support APL and users who access the language through time-sharing systems are invited — indeed urged — to submit listings or tapes of their programs or information about APL functions they feel would be of interest to other users.

The university will do some relatively minor screening of the programs, but

essentially all programs submitted will be listed and described in a printed catalog called *APL/PIE Detailed Documentation*. An on-line inquiry service will also be made available to users.

If copies of programs are available in reproducible form, they will be sent on request to exchange members. Any restrictions on distribution requested by the program originator will be respected by APL/PIE, and users requesting programs will have to provide their own tapes for the copying.

Suny-Binghamton has said that it will donate its resources in terms of computer time and personnel. The only cost to users for membership will be a \$5 fee to defer the cost of publications.

370/155 Main Machine

The university's main computer is a 370/155 running APL/360-OS, Version 1 Mod 1, with 36K workspaces. User tapes of programs that are compatible with that

system and that can be read by standard IBM APL will be accepted.

Tapes for non-IBM APL implementations cannot be accepted. Programs developed on any of the commercially available APL time-sharing systems may be acceptable as long as they do not use special operands or workspaces larger than IBM's standard.

Guilty, Not Responsible

In an effort to keep costs under control, the managers of APL/PIE have said they would take no responsibility for the quality of the contributions and they reserve the right to return workspaces that do not meet minimal documentation standards or that are redundant in terms of programs already in the clearinghouse.

Programs will generally be cataloged in one of three levels within APL/PIE. Documentation and functions of programs deemed of general or frequent interest will be maintained both on- and off-line.

Catalog entries and DESCRIBES (the APL equivalent of comments) on all other programs actually submitted and accepted by the clearinghouse will be maintained on-line, but the workspaces themselves and detailed documentation will be off-line.

Other Workspace References

The third level covers references to workspaces not distributed by APL/PIE. DESCRIBES will be maintained on-line, if possible, and notes on where the workspace can be obtained will be part of the hardcopy documentation.

Coordinator for the APL/PIE project is Geraldine MacDonald, at the computer center, Suny-Binghamton, 13901.

'Metabase' Logic Manages Data For On-Line, Batch Operations

NEW YORK — Data base operations can be handled efficiently, on-line or in batch mode, in a 50K-75K OS/360 region, with the Metabase data base management system, now being marketed and supported by Programming Methods Inc. (PMI).

Developed by Computer Corporation of America, Metabase utilizes inverted file structures to access records and fields more quickly than is possible with other techniques, a PMI source said.

The system allows any number of data field types to be designated as key fields used as a basis for data retrieval. Boolean and numerical relationships can be used to describe complex retrievals based on these keys, PMI added.

With Metabase, data is stored in variable length fields, either singly or in repeating groups, and no space is allocated within a record if there is no data for the field. As with most data base systems, the fields that make up the records, and therefore the data base, may be altered without affecting existing programs.

All file maintenance facilities are available so that users can add, modify, read, find or delete records. Metabase can be invoked from BAL, Fortran, Cobol or PL/I application programs.

A query language is available as a separate product, allowing retrieval and update requests to be executed from remote terminals.

A single copy of Metabase, loaded in its own region as a separate OS job, can be used by both batch and on-line application programs. The system can be inter-

faced with various teleprocessing monitors, including PMI's own Intercomm.

The basic Metabase system including a number of utilities is now available for \$28,000. A special File Load (Flod) utility, used to build a specially formatted Metabase data base from sequential data files, costs \$4,000, as does an interface package for Intercomm.

Lease plans are also available, the company added. A division of GTE Information Systems Inc., PMI is at 1301 Avenue of the Americas, 10019.

Package Eases Cobol Debugging

CANOGA PARK, Calif. — Cobol programmers working in a batch environment can gain many of the debugging facilities available to interactive development operations, with the JSCDEBUG package recently introduced by Joseph Sider & Associates Inc.

With this tool, the developer said, the number of recompilations during the test phase can be sharply reduced, and with that cutback, the entire development cycle should be markedly shorter.

Through the Sider package, users are able to set breakpoints at test time so that they can display selected file and working storage areas, analyze the flow through selected logic paths at any time during the run, or identify records with fields causing data exceptions.

Other facilities, brought over from Sider's earlier Data Exception Bypass package [CW, June 27], allow the test to

continue despite any data exceptions encountered.

The new package can also be used to alter working storage or the instructions within a program. The patches generated only affect the program as loaded in the computer, however, and do not alter the basic object code stored on cards or in a source statement library.

Identification of where the Branch should be placed and what patch area to use is determined, Sider explained, from a review of the procedure map also generated at normal compile time.

The JSCDEBUG package is available immediately for either OS or DOS/360-370 users, at purchase costs of \$3,500 and \$2,500 respectively. It may be rented for \$150/mo or \$100/mo, and all options include availability of seminars in the package's use, conducted at Sider's headquarters, 6701 Variel St., 91303.



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OEMs Only — for Now

Package Changes Adpac to Cobol or Assembler Source

SAN FRANCISCO — Computer manufacturers and DP service organizations that need OEM-like software support can add some flexibility to their operations through the Adpac-S language system from Adpac Computing Languages Corp.

Adpac-S takes the multi-language translation scheme originally introduced two years ago in the company's Polypac scheme, but carries it several steps further. Polypac, and now Adpac-S, essentially allows a user to code a program in one language and then convert it into several other source codes.

The developer envisioned a set of modules, each devoted to a particular language, that could, on the one hand, analyze the original input source ("host") language and, on the other hand, convert that analyzed logic into a desired output or target source language.

By mixing and matching host-target modules, users could work with any combination of languages and be essentially machine-independent as they developed application logic.

Currently the only host module is one that analyzes coding written in the original highly structured Adpac programming language. From this, however, target modules already available are able to produce ANS Cobol subsets for IBM 360/370, Univac 9000 series, NCR Century 200s and Burroughs B 3500 or Assembler language coding for 360/370 and IBM's System/3.

But Adpac-S goes beyond this fairly extensive implementation of the Polypac concept. The new system supports easy "interfaces with many standard communications and data management systems as well as file-accessing methods," the company claimed.

Subsystems of Adpac-S include documentation routines which add narrative explanations, along with flowcharts of the technical structure of a program. Another subsystem is a librarian opera-

tion that performs the functions needed to create and update a source statement library.

The developers see Adpac-S as an extremely useful tool for commercial software houses or centralized corporate DP staffs. In either case, the user can create program logic in one form and then convert it into one or more languages to be run on almost any equipment the custom-

er, division or subsidiary might have in its installation.

Adpac-S is available now but only to computer manufacturers and professional service organizations. Cost of the system varies from \$450/mo to \$750/mo depending on the number and types of target modules selected.

Adpac Computing Languages Corp. is at 101 Howard St., 94105.

Letter Writer Allows Selection Of Addressees, Executes in 20K

BURBANK, Calif. — IBM 360 users with as little as 20K bytes available can mass-produce listings, labels or personalized letters addressed to selected subsets of a major file, with the Mail-All list maintenance and letter-writing software now available from Occidental Computer.

The package permits creation of variable master files for input, updating of the addressee files once created, pull and select options, and duplication purges and housekeeping operations. Letters produced, based on up to 250 lines of text stored in core, may be one-up or two-up and in upper-and-lower case type if the user has the proper print chain.

Labels prepared from the specially formatted name/address files used by Mail-All can be one-, two- or four-up for economy of printing time and paper stock.

The system differs from most others, the developers said, since it includes a set of statistical analysis programs. Users can tally and then summarize returns from mailings or other output generated by Mail-All.

The summary can be shaped to target on state counts, response volume, dollar sales analysis or any other selected field in the "master file."

The Occidental approach — with the internally stored text — permits the printing of only one type of output with each pass of the system, but keeps the program logic simple enough to be easily maintained, and the I/O operations to a minimum.

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Written in BAL

Because output is the raison-d'etre for the software, the programs are written in BAL for processing efficiency, and Occidental spokesmen said they "wouldn't be surprised" to hear that most installations were using output-spooling techniques as well.

The system is available from Occidental, at 805 S. San Fernando Road, 91505, for a one-time cost of \$660, which includes source code.



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Data Briefs

\$65 Touch-Tone Pad Converts Phone to Input Terminal

ST. LOUIS, Mo. — Interface Technology, Inc. has two pocket-sized Touch-Tone generators that can be acoustically coupled to any standard telephone for transmission of data to a computer from remote locations.

Bell-compatible tones are produced through a 12-key pad. Remote operators can have two-way communication with the computer when the CPU has an audio response unit. This allows the remote operator to verify his inputs and to receive data from the computer, the firm noted.

The Model 720, with an external speaker that fits over the phone mouthpiece, costs \$65.50. The Model 721, which has an internal speaker and molded-in ring that has to be held to the phone mouthpiece, costs \$58.

Interface Technology plans to introduce a Model 722 soon, which will include four function keys plus the 12-key pad and cost \$76.

The firm is at 10500 Kahlmeyer Drive, 63132.

Bell Canada Upgrades 201 Line

OTTAWA, Ont. — Bell Canada has a new 201-type data set for Canadian users that will rent for less than earlier models. The rental price of installed models will be reduced to the level of the new data set.

The new modem is a desk-top unit that transmits data at 2,000 bit/sec. Voice control and switched network controls are provided by an auxiliary six-button telephone set.

A reverse channel feature, using frequency shift key modulation for half-duplex operation, is available as an option.

The data sets rent for \$95/mo and there is a one-time service charge of \$50. The reverse channel option costs \$15/mo with a \$30 service charge.

Bell Canada's Computer Communications group is at 160 Elgin St., 11th floor, K1G 3J4.

Switch Switches Modems

MOORESTOWN, N.J. — Spectron Corp. has a fall back switch that can switch modems or terminals between on-line and stand-by equipment. The unit will accommodate up to 12 EIA-RS232 interface channels with full switching of all 24 leads.

Each individual channel can be switched separately or the unit can be gang-switched. The unit can be set for either local or remote actuation.

The Model 1224 costs \$1,800 with delivery in two to four weeks from Church Road and Roland Ave., 08057.

College Users Told

FCC Favors Continued Interconnection

By Ronald A. Frank
Of the CW Staff

ROCHESTER, N.Y. — The interconnection of customer-provided communications equipment will continue to be encouraged by the Federal Communications Commission because the FCC believes the "anti-competition posture of the present carriers must be reduced." The "interconnection of customer-provided devices is seen as one avenue of encouraging outside competition," said Frank Laden, chief of the telephone branch in the domestic services and facilities division of the FCC.

Speaking at the annual conference of the Association of College & University Telecommunications Administrators (Acuta), Laden said the Bell Data Access Arrangement "is a cumbersome arrangement, accepted at least temporarily as an interim measure while the FCC determines a more reasonable national approach to the [interconnection] problem."

The key question to be solved is how to protect the telephone service customer, the telephone employee and the telephone network "from harm possibly introduced by a customer-provided piece of apparatus," Laden said.

Little Progress on Standards

The FCC official recounted the various decisions that had been made in the area of interconnection and added that the present FCC advisory committees have thus far made little progress in suggesting permanent standards. One reason the advisory committees cannot agree on a "viable solution" is an "inadequacy of data" to demonstrate that "suspected illegal interconnections are truly harming people on the network as contended by Bell," he said.

"Neither Bell nor the other phone companies have provided any evidence to show that harm is really being suffered," Laden added.

The present advisory committees, which were first set up in March 1971, have yet to agree on proposed standards and there is no concentrated effort by Bell to effect an "easy decision," the FCC staff member said. In contrast, on the state level, the Rochester Telephone Corp. plan for interconnection of intrastate customers using the Network Protection Device (NPD), was approved and implemented in about two years, he said.

Free From Bell

Speaking at a session on interconnection, David Mitchell, customer relations manager for Rochester Telephone Corp., related how his company had worked to implement its interconnection plan. Since Rochester is an intrastate carrier it was not forced to go along with any interconnection plans that had been agreed to by the FCC, Mitchell said. This meant it was

free to initiate an intrastate plan that was different from Bell's DAA, he said.

"Interconnection really means change and it has meant competition for Rochester Telephone," Mitchell said. A new rate structure may have to be initiated so that the user with customer-provided equipment more nearly pays his own way, Mitchell said. Such "cost supportive pricing" will be the way of the future in phone rates, he predicted.

Walter W. Long, corporate communications manager for General Dynamics Corp., told the college communications managers when they install customer-provided equipment they have to be able to accept responsibility for the operation of that equipment. "You become the phone company" at your organization, Long said.

DAA Is 'Garbage'

Presently required interconnection adapters such as the DAA are "garbage" Long said, and he predicted that eventually they will no longer be required. One of the biggest problems for the user planning a non-carrier system is finding out exactly what equipment he has been paying the phone company for, the user said. Often the local phone company will charge a fee to come in and give you a list of the items you have been charged for, Long said.

More than 50 academic telecommunications managers attended the Acuta con-

ference. At a business meeting of the organization, Gerald L. Johnson, manager of the telephone services and facilities department at the University of Chicago was elected president. Acuta currently has about 120 member schools and 75% of these have at least some data communications applications, Johnson said.

Future meetings of the organizations



CW Photo by Ronald A. Frank

Walter Long

will stress ways to improve the technical competence of the members, Johnson said. The next annual conference of Acuta will be held in July 1974 at the University of Southern Mississippi.

Further information about the organization and its activities is available from the secretary, William T. Miller, director of telecommunications, University of Southern Mississippi, Box 405 Southern Station, Hattisburg, Miss. 39401.

High Speed Analysis--Part I 9,600 Bit/Sec Is Still Risky

By Ronald A. Frank
Of the CW Staff

NEW YORK — Data transmission at 9,600 bit/sec on private line networks is still a risky operation for most users. And the major problem is that line characteristics required for the efficient operation of non-carrier 9,600 bit/sec data sets are not officially recognized in AT&T tariffs.

The Bell System companies deliver strictly a 3002 line with C2 conditioning and if they stop at just meeting these specifications, which they are within their rights to do, then they overlook crucial parameters, according to one veteran high-speed data user.

In many cases these parameters which may or may not be recognized by a local Bell System operating company make the difference between an efficient or poorly operating data line. Included in this category are such characteristics as phase jitter, harmonic distortion and impulse noise hits.

Fortunately for 9,600 bit/sec users, most phone companies are making a concerted effort to make their line specs meet the characteristics required by non-

Bell data sets. The difficulty in these situations is that any arrangements between the carrier and the user must be worked out on a person-to-person basis.

High Speeds Pressing AT&T

An AT&T marketing source admitted that the line characteristics now spelled out in the tariffs may need to be changed. "We are looking into a higher performance type of channel," the Bell expert said. "The higher speeds like 9,600 are pressing us, and users may require new line specifications."

But the cost to the user of "bringing everyone up to a much higher performance standard" might be higher than current rates, the AT&T spokesman said.

The AT&T official said the Bell 203 data set does operate at 9,600 bit/sec but its efficiency is highly dependent on line quality. If the Bell data set can be made to function at 9,600 bit/sec, it is because the user has been provided with ideal line facilities. But since Bell will not officially hand-pick lines for a customer, reliable operation of the 203 is often a question of luck for the user.

The ADAC 1200 is a natural outgrowth of our experience in design, mass production and delivery of acoustic couplers for the 0-300 bps market. It was the first 1200 bit acoustic coupler. It's now field proven in hundreds of installations across the country.

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Xerox 530 Gets Communications Program

EL SEGUNDO, Calif. — Xerox has introduced a communications program for the 530 computer that will allow the system to be used as a remote satellite processor.

The program allows the 530 to perform local background processing and real time operations while communicating with a host CPU. First deliveries of the 530 are scheduled for later this year and the new program will be available in the first quarter of 1974.

Offered as a standard software package to all 530 users at no cost, the processor is designed to run under both currently available 530 operating systems. It

will also communicate with a host Xerox Sigma computer running under the Control Program-Five (CP-V) operating system.

In addition, the satellite processor will operate in accordance with the IBM Hasp binary synchronous (Bisync), multi-leaving protocol, allowing the 530 to communicate with any non-Xerox host computer operating in this mode, the company said.

Data Spooled

The software supports data rates of 2,000 bit/sec to 9,600 bit/sec over leased or dial-up lines, and operates in both full-

and half-duplex modes. Data may be spooled to magnetic tape or to disk to provide optimum use of memory, CPU and peripherals, the firm noted.

To increase throughput, the program adjusts its resource requirements to the hardware environment existing at a particular Xerox 530 computer site and to the scheduling and core partitioning requirements of background and foreground activities.

Minimum configuration for the new program includes the basic Xerox 530 computer with 8K words of memory, a keyboard printer, a card reader, a line printer and a data set controller.

Unit Transmits Optical Data

ANAHEIM, Calif. — Datum Inc. has announced the Model 5098 Optical Mark Document Reader Terminal which assembles — into Ascii alphanumeric characters — data read from pencil marked, pre-printed forms, tags or page-size documents.

The data is formatted and buffered for asynchronous transmission via a telephone line modem. Each 12-bit document entry is translated into two 10-bit (or optionally, 11-bit) asynchronous serial characters. Normal scan speed is 13 in./sec, with other speeds available.

Transmission rates up to 9,600 bit/sec are available. Price for a standard Model 5098 is \$1,995 from 170 E. Liberty Ave., 92801.

Coder Embosses Cards For Credit Users

CARSON, Calif. — Mag-Tek's range of MT-40 series encoders embosses magnetic stripe credit cards to three industry standards.

The Model I handles ABA, Model II handles ABA and IATA and the Model III handles all three. The Model II can be "field modified" to add the Mints encoding capability, the firm stated.

Users can encode about 60 bank credit card/hour, the firm said, but security card users can achieve a higher rate. A teletype-writer option to automate input increases the encoding to 500 credit card/hour.

All the models have a verify mode which can check previously encoded cards to see that they meet the standards.

For security, the MT-40 encoders have a key lock and a non-resettable counter.

Single unit price of the Model I is \$6,750; the Model II costs \$8,250 and the Model III costs \$9,250. Delivery is 30 to 60 days from 1513 East Del Amo Blvd., 90746.

DATA 100 Offers Expanded Line of Intelligent Terminals

DATA 100 offers users a versatile family of remote batch terminals with a wide range of peripheral capabilities. For Intelligent work consider these:

MODEL 78 The leader in providing communications versatility and cost performance. Now includes industry standard RPG programming language for enhanced off-line processing. A full line of I/O devices, including 1250 lpm printer.

MODEL 74 This new low-cost interleaving HASP work station replaces Model 360-20's and 30's and also offers 2780, 3780, and 2922 capabilities. Additional features allow emulation of DCT-2000, 1004, and 200 U.T.

MODEL 88 Data entry terminal devices providing key entry, powerful editing capabilities, and 2780 compatible communications.

Superior price performance, peripheral selection and service are the major reasons over 1,400 terminal users selected DATA 100.

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GATES 

Bits & Pieces

Fast Disk Subsystem

Attaches to Most Minis

CANOCA PARK, Calif. — Mini-computer users with substantial disk-oriented applications can obtain a disk subsystem from Alpha Data, Inc. that provides data access time markedly faster than most disk and drum subsystems commercially available, the firm said.

Members of the new family of disk memories have an average access time (user specified) as low as 2.1 msec with storage capacities ranging from 1M to 16M bits. Packing density is 4K bit/in.

Alpha Data presently has a controller for attaching the disks to Nova mini-computers and expects to release a controller for the PDP-11 in the near future, the firm noted. For users of other mini-computers the firm will obtain an appropriate controller from an outside firm to effect installation, it added.

Prices vary with capacity and access time. A 4M bit (250K word), 4.2 msec disk subsystem costs \$5,000. The firm is at 8759 Remmet Ave., 91304.

Calcomp Has Double Density 3330

ANAHEIM, Calif. — Calcomp has developed a double density disk drive compatible with the recently announced IBM 3330 double density disk subsystem [CW, July 25].

Calcomp's Model 1030 has the capacity to store 200M byte/spindle or 1,600M byte/subsystem.

As with the IBM subsystem, the 1030 permits the intermixing of double and single density disk drives with one controller.

Calcomp will not make these disks available until the third quarter of 1974. The firm said it wants to see the IBM disk subsystems first to develop a pricing strategy and assure that their units are totally plug-compatible.

Cleaner Restores Tapes

ROCKVILLE, Md. — Instrumentation tape users can restore used tape with the Model 720 Instrumentation Tape Cleaner Winder from General Kinetics, Inc.

Accepting glass and metal NAB/EIA reels from 10-1/2 to 16 in. in diameter, the 720 cleans both 1/2- and 1 in. instrumentation tape.

The tape cleaner utilizes GKI tape cleaning techniques, combining an endless loop blade cleaner (rated at 96% effectiveness in an independent government test) with automatic-advance tissue wipers made of a special cleaning fabric, the firm explained.

The GKI Model 720 is priced at \$5,752 from 12300 Parklawn Drive, 20852.

Portable Vault Protects Tape

ROCHESTER, Ind. — Users who have experienced problems such as distortions, partial erasure and degradation of data recorded on magnetic tapes can obtain a protective portable storage case from Advance Magnetics.

Two models of the AD-MU Presidential Tape Data Protectors are available: Models TDP-5 and TDP-2 have a capacity of five and two standard 10.5 by 0.5 in. tapes, respectively.

Price for either model is around \$70 from the firm at 226 E. Seventh St., 46975.

Optional Tape Reader Offered

BURLINGTON, Mass. — An optional paper tape reader is being offered with the Computer Devices Inc.'s Teleterm time-sharing terminal.

At a cost of \$900, the CDI reader sends data at 30 char./sec — three times faster than TTY-driven tape readers, according to the firm's spokesman at 9 Ray Ave., 01803.

Microprogramming Unmasked -- Part II

Hardware Simplified Yet More Powerful

By Ira Gabbert

Special to Computerworld

The concept of microprogramming is not new. In the early 1950s, Prof. M.V. Wilkes proposed this technique as a systematic way to produce the control sequences of a digital computer.

But at that time the concept was ahead of the technology: memory prices were high and the cost of standard logic elements was relatively low and getting lower. Big, hardwired computers dominated.

A new architecture was needed before microprogramming could become a practical reality. Registers in a hardwired machine typically had private data transfer busses to other registers in the system (Figure 1).

The new architecture removed the inflexibility created by these busses and thus also removed the sequencing and gating logic required to govern their activity (Figure 2). The same registers are present, but they have been reorganized to operate with only two busses.

Consider the following table showing the hardware implementation of a standard Add instruction.

MAR ← LOC	Load memory address from location counter
Memory Read	Start memory read cycle
IR ← MBR	When access complete, load instruction register
MAR ← IR x:y	Copy address field of instruction to MAR
Memory Read	Start operand access
A ← A + MBR	When access complete, add MBR and A, leave result in A

LOC ← LOC + 1 Increment location counter

These steps, implemented by a time counter or other form of sequencer, and an assorted group of logic elements on the hardwired systems could just as well be discrete instructions in a microprogrammed system.

The rearranged architecture makes possible more combinations of register transfers than are possible in a typical hardwired system.

Other Advantages

Microprogramming offers other advantages to the user in that the microprocessor is relatively simple in design, and by eliminating clocking and control logic, is generally more reliable. Documentation is easier as is the effort to troubleshoot the microprocessor as each microprogramming statement relates to one distinct hardware operation.

Once in the field, the user's computer can be revised or changed without any hardware costs. Features can be added by

adding more microprograms.

Added features are most often in the form of new user-level instructions suited to the user's particular needs.

Take a typical example of a microprocessor that has been microprogrammed to perform 57 different user instructions. The microprocessor holds these microprograms in its own control store memory, but may still have room for another 50 or so instructions.

These optional instructions might include multiply and divide, block I/O, floating point instructions, floating point trigonometric functions, instructions with indirect addressing capability, list handling instructions, text editing instructions, etc. If the hardware is capable of performing a specified operation through a set of sequenced events, a microprogram can be written to achieve this objective.

In general terms, a good microprogrammable system is one capable of performing its task in the most efficient manner. Efficiency is normally equated to speed, although the number of microinstructions required to complete a task must also be considered.

If the primary task of the system is to emulate a given user-level processor, it is advantageous to endow the microprocessor with features which ease the particular emulation task.

There Is a Limit

Other capabilities that would ease the emulation task are hardware user-level fetch and decoding, automatic interrupt priority sorting, hardware multiply and divide and extended precision arithmetic capability. Obviously though, one could go on adding hardware features in this manner until the microprocessor has become a very expensive and complex hardware version of the user-level processor.

A primary user evaluation task in choosing a microprogrammable computer is to determine, based on his needs, where the trade-off in improved hardware features of his microprocessor should be made in the name of cost.

There was a time when cost was a prime factor in deciding how many specialized functions a microprocessor would perform. Recent technology advances in Large Scale Integration (LSI) and semiconductor techniques have acted to reduce costs.

These cost reductions have acted to reduce one side of the user's evaluation problem. He must still determine the answer to the first rule of computer evaluation: how much is it costing in time and money to achieve a desired result? Microprogramming, while a viable and many times superior alternative, does not relieve the user from this task.

Ira Gabbert is a senior microprogrammer at Interdata Inc.

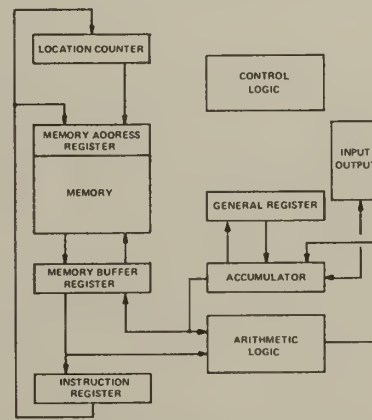


Figure 1. Architecture of a Standard Hardwired Machine

DEC Adds Commercial Time-Sharing To Business Datasystems Family

MAYNARD, Mass. — Digital Equipment Corp. has added four models to its Data systems family designed for small business users.

Models 530, 540, 550 and 560 are designed to provide upgrade capabilities for existing Datasystem 520 users as well as make these systems more appealing to initial users needing more data processing power, the firm said.

In building the Datasystem family, DEC has combined hardware and software components that existed separately within the PDP-11 series into a single package.

One feature new to the latest models is the availability of a commercial time-sharing operating system that will support up to 32 simultaneous users. Other operating systems commonly available to all 500 series units include a batch-oriented operating system using RPG II and a data management system that permits multiple users to access and update common data bases.

The user level language within the time-sharing operating system is a version of Basic which includes features such as a disk Sort utility program, Indexed Sequential Access Method, decimal arithmetic and line printer spooling.

All 500 systems can be configured to support up to three of the following on-line storage systems: cartridge disks, large capacity disks, fixed-head disks and magnetic tape.

The Model 530 comes with 32K bytes (expandable to 56K bytes) of memory and accommodates up to eight disk and

eight tape units, and up to four on-line terminals.

The 540 has a main memory expandable to 248K bytes and can be configured with up to 16 disk and eight tape storage subsystems and up to 16 on-line terminals.

The 550 comes with memory sizes up to 248K bytes and is designed to support an extended version of the time-sharing operating system.

The 560 is a supercharged 550 that mixes fast semiconductor memory with standard core memory.

Complete systems range in cost from \$62,000 to \$400,000 with first deliveries set for the fall.

Centronics Printers Attach To Honeywell 316, 516

HUDSON, N.H. — Honeywell 316 and 516 users can attach Centronics printers with an interface contained on a single circuit board located within the printer.

The Centronics interface accepts 12-bit parallel data from the computer, converts this input into two 7-bit Ascii characters, and transfers the two characters, one at a time, to the printer.

Honeywell users can select from five Centronics printer models with speeds ranging from 100- to 300 char./sec, 60- to 200 line/min, and 80 or 132 char./line.

The interface is priced at \$1,200. Printers range in price from \$1,995 to \$4,635 from One Wall St., 03051.

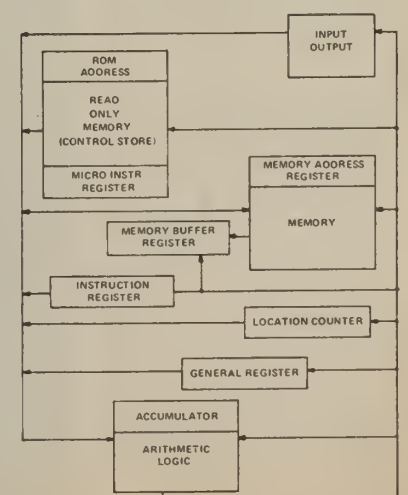


Figure 2. Architecture of a Microprogrammed Machine

Bits & Pieces

MDS Printers Available For 40% Off List Price

BOSTON — Looking for a good deal on a printer? American Used Computer is offering brand new Mohawk 4320 buffered line printers for \$4,850 (initial list price from MDS is \$11,950).

However, the user must get or design his own interface for the 300 line/min units.

The firm is located at P.O. Box 68, Kenmore Station, 02215.

Controller Permits Interdata Users to Attach IBM Disks

EATONTOWN, N.J. — Interdata 70 and 80 minicomputer users can obtain a controller (mounted on two boards) which plugs directly into their mini's mainframe to enable the attachment of IBM-compatible 2310-, 2311- and 2314-type disk drives.

A single controller from Diva, Inc. will handle up to four drives — with an option permitting the attachment of up to eight drives.

The controller provides for positive verification, write protection and alternate track assignment. Additionally, it can be configured to derive 24 logical sectors from disk packs physically marked for 20 sectors.

Price for the controller in a mini format is \$7,500 and for the IBM media compatibility format \$10,500. The firm is at 607 Industrial Way West, 07724.

GE Enhances Family Of Process Control Systems

PHOENIX — Users with process control applications requiring more computer power than available in a standard minicomputer may find an answer in a new series of medium-to-large scale process control systems recently announced by General Electric.

The GE-PAC 4400 series will consist of two models, the GE-PAC 4401 and GE-PAC 4402 which are twice as fast, have twice the memory capacity, and occupy one-half the space of present GE process computers.

Internal cycle time of the central processors is 800 nsec. The processors use a parallel, 24-bit internal design with memory sizes ranging up to 32K words and 66K words for the 4401 and 4402 respectively. Memory increments are in 8K word blocks.

Prices range from \$100,000 to \$500,000 for the 4401 and from \$250,000 to \$1 million for the 4402.

Tape Reader Handles ROMs With Opposite Logic

FORT LAUDERDALE, Fla. — An operator using the Spectrum Dynamics, Inc. 510 Tape Reader can program/verify either logic "0" or "1" from the same tape by setting a switch on the new optional Tape Format Conversion Selector.

As a result, programmable ROMs having opposite logic may be utilized without generating a new tape, the firm's spokesman said.

The conversion selector option is priced at \$100 from 1302 W. McNab Rd., 33309.

For Mini Users

Tape, Disk Combined in One Peripheral

MOUNTAIN VIEW, Calif. — Minicomputer users can obtain a single peripheral — controlled through one I/O slot — that combines both a tape and a disk subsystem, from Tri-Data Corp.

User benefits of the two-in-one Cartrifile 211 system, according to the firm's spokesman, are cost savings in day-to-day operation and savings in initial purchase price.

The rationale for the operating savings is that the single unit "saves 20% to 30% of the programming necessary to run

separate tape and disk peripherals."

Hardware savings come from integrated design that "enables the controller, data electronics and interface to be shared by the tape cartridges and disk," he added.

The 211's two tape drives have a data transfer rate of 48K bit/sec with the sealed moving-head disk having a transfer rate of 1.36M bit/sec.

On-line storage is about 11.5M bits on two 150-ft tapes and 2.5M bits (formatted) on the

disk, with all data transfers in parallel 8-bit byte format.

Tape drives operate at 1,600 bit/in. with a tape speed of 15 in./sec.

Disk access time includes 10 msec, track-to-track; 10 msec settling; and 16.7 msec average latency. The disk can be sectored into 1, 2, 4, 8 or 16 sectors — with capacity per sector at 16 sectors being 310 bytes.

The first interface for the dual system will be available for the PDP-11 minicomputer with

other interfaces scheduled. Price for the Cartrifile 211 with the PDP-11 interface is \$5,995 from 800 Maude Ave., 94043.

Tri-Data's Cartrifile 211

Datashare

A New Equation in Computer Systems **1=8**

Can Slow Memory Find Happiness With Fast CPU?

By Michael Weinstein
Of the CW Staff

Users should take the internal speed specifications of any proposed computer system seriously.

A computer system is only as fast as the slowest operating component. For example, combining a fast central processor with a slow memory makes the memory the critical component.

A classic example of machine with this architectural problem is IBM's 370/155 which contains a central processor that cycles 18 times faster than main memory.

The weakest link in the 155

architecture is the main memory which cycles at about 2.07 μ sec.

The central processing unit is the heart of the 155 with a cycle time potential of 115 nsec. The CPU can fetch or store a maximum of one 4-byte word at a time. Although it can store up to four bytes at a time, it often stores less — even a single byte — depending on the instruction being executed.

If these were the only components, the CPU would spend over 90% of its time waiting for the next memory cycle. Other components have the major job of dropping the 90% wait time.

The Storage Adapter inside the

155 processor mainframe is the interface between main storage and the rest of the processor. The storage adapter's function is that of a controller supervising all fetch and store requests to main memory.

Its communication with main storage is based on an internal timer that matches the 2.07 μ sec cycle time of main memory.

The Buffer Control Unit (BCU) is included in the 155 mainframe in an attempt to increase throughput above that possible with the basically slow main storage.

The buffer storage controlled by the BCU is the 155's cache

storage: 8K bytes of 60 nsec memory.

The throughput gains possible with the cache system are achieved by storing currently in-use portions of main storage in cache, and accessing the information in cache instead of main memory.

In the 155, the BCU keeps track of what specific information is presently in the buffer area, and on that basis directs storage fetches to either the buffer or to the storage adapter depending upon the location of needed data.

All CPU and I/O channel store and fetch requests are made

through the BCU.

Buffer storage (cache) is nothing more than a very high-speed monolithic storage area. It is divided into 32-byte segments that map to specific areas of main storage. Anytime the CPU requests a word of information from main storage, the BCU checks to see if it is in cache.

This checking is accomplished through a complex indexing scheme.

If the word is in cache, the transfer is made directly from cache to the CPU in 230 nsec (two 115 nsec CPU cycles).

If the information is not in cache, the BCU initiates a main storage fetch through the storage adapter. All main storage fetches result in the transmission of a quadword (16 bytes) within the 2.10 μ sec cycle time (equivalent to 18 processor cycles).

Since the CPU is capable of accepting only four bytes at a time, the additional 12 bytes transmitted would go unused if it were not for the cache system.

The cache system directs all 16 buffer and the single requested word (four bytes) to be forwarded to the CPU. The 16 bytes are placed in half of the 32-byte segment that corresponds to the area of main storage referenced. As more information is placed in that buffer it becomes necessary to overlay after the third fetch. The overlaying is done in an odd-even manner with the oldest 16-byte block overlaid.

If the CPU is processing sequential instructions, there is a high probability that the next memory word required will be the next sequential word, which will be the next four bytes of information in the updated cache segment.

This word can thus be transmitted to the CPU in 230 nsec instead of 2.07 μ sec.

It is important to note that only CPU fetches can take advantage of the cache system. Store operations must be made by main storage (as well as cache) and all channel activity, either fetch or store, must be made to main storage.

The only effect channel activity has on cache is to possibly invalidate information contained in the buffer whenever the corresponding area of main storage is changed by a store.

I/O operations must also access main storage. This access is accomplished 16 bytes at a time both ways, store and fetch, at the 2.07 μ sec rate.

Datashare from Datapoint Corporation constitutes an important innovation in the use of computer systems for business administrative and management applications. Through Datashare, the full capability of a *single* Datapoint 2200 computer system is made available simultaneously at as many as *eight* remote user stations on terminal units as various and as inexpensive as Datapoint 3300's, Datapoint 3360's and standard teletypewriter machines.

With well over two thousand Datapoint 2200 systems currently in use, this versatile low cost system has established an enviable reputation as an all purpose business computer. Now through the Datashare programming package, as many as eight remotely located users can utilize a Datapoint 2200 system as though it were their own on-site computer for on-line data input tasks and other general business applications. But with these key differences: this access is achieved (1) at *just a fraction* of the already low cost (prices begin at \$6,040) of the 2200, and (2) *without the waiting and inconvenience* often associated with the usage of an on-site computer.

Through Datashare, business and commercial computer users can enjoy the full benefits of the many recent advances in computer and data communications technology incorporated into Datapoint equipment. Through the combination of

the Datashare system and the Databus programming language, users can readily create application packages for most general management and administrative needs such as real-time inventory control, parts replenishment, production scheduling, labor distribution and other dynamic applications involving volume data input from multi-locations and associated production of reports.

Each remote user on a Datashare system accesses the central Datapoint 2200 independently from his own terminal unit, for his own application needs. For users in close physical proximity to the 2200 as in the same facility or building complex, communications with the central computer is obtained through direct wiring. For cross-city or cross-country users, linkage can be provided through standard telephone service.

The central Datapoint 2200 system used with Datashare can incorporate from one to four disc file units each capable of storing 2.4 million characters of informa-

tion in replaceable cartridges for user data files and programs, and a high speed printer. For "Off-line" use as a standard 2200 system, the configuration can also include a card reader, 7- and 9-channel magnetic tape units and other Datapoint peripherals as well as the disk units and printer.

Datashare delivers a new kind of dispersed data processing capability for organizations whose operations are decentralized but who want to enjoy the economies and the management advantages of centralized data processing. For present and prospective business computer and computer service users, Datashare presents an optimum approach to securing new efficiencies and new economies in data conversion and entry, data transmission and data processing. For further information on Datashare and how it can help your business, contact the Datapoint sales office nearest you, or write or call:

Datapoint Corporation
9725 Datapoint Drive,
San Antonio, Texas 78284
(512) 696-4520



Moving Head Disk Gives Nova Users 80M Bytes

FULLERTON, Calif. — The Model 2610-040 Moving Head Disk System from Media III is designed to give Data General Nova Series and DCC D116 series minicomputer users a combination fixed and removable storage subsystem of up to 80M bytes.

Each subsystem is composed of a controller and up to eight Diablo Series 44 top load, 200 track/in. disk drives. Each drive is comprised of a fixed disk and removable 5440-type cartridge.

System prices start at \$9,495, which includes the controller and one drive with 5M words (10M bytes) of storage. The firm is at 2454 E. Fender Ave., 92631.

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Computer Users More 'With It' Legally

By Toni Wiseman
Of the CW Staff

BOSTON — Users are becoming more sophisticated and more aware of the legal ramifications of the contracts they negotiate with suppliers, driving legally harder deals and making more meaningful transactions than 10 years ago.

This, at least, is the opinion of Roy Freed, Boston attorney, who is planning chairman for the "Law and Computers in the Seventies-II" course, sponsored by the American Law Institute (ALI) and the American Bar Association (ABA), which will be held Sept. 13-15 in New York.

The ALI-ABA course, though

designated a continuing education course for lawyers, will interest any user who may sometime be involved with contracts, a liability suit, insurance or anti-trust transactions in the computer industry, according to Freed.

What Really Is

The problem today, as Freed sees it, is not the need for new or special rules of law to handle questions involving computers, but rather the need for a better understanding of the realities of the technology, from a legal point of view, to cause existing laws to work properly.

"The existing rules of law (and

reflections of public policy) are very general," Freed said, "and therefore can accommodate substantial technological developments relatively easily."

"The problem arises," Freed stated, "where a company's primary business is running a computer, like a commercial time-

Societies/ User Groups

sharing operator. The lawyer's problem is to convince tax authorities that such a company is engaged in manufacture by virtue of operating that system and therefore entitled to tax exemption," he said.

Freed drew a parallel between the time-sharing company and the electricity generating company which, a number of states have decided, qualifies as engaging in manufacture.

The impact of tax laws is a necessary consideration in any transaction, according to Freed, including computer industry

ones.

For example, he said, it may be essential for a user to force the supplier to break down a bundle in order to avoid inordinately high personal property and sales taxes. If a single price has built-in charges for education and training, software and maintenance, it creates an inordinately high value for the system that then is subject to a personal property tax.

"The trick is to break those things out and characterize them as non-property transactions to reduce the value of the system to the lowest possible value," Freed said. "If only the hardware remains as actual property, then the user has the terms best for him tax-wise."

A final, but important consideration, Freed added, is that agreements are communications means, scenarios, which must be laid out for ultimate possible presentation before a court, and therefore must be both technically and legally sound.

International Symposium Covers Microprogramming, Networks

DAVOS, Switzerland — The International Computing Symposium 1973, sponsored by the European chapter of the ACM, will be held Sept. 4-7.

Four parallel sessions will cover the fields of networks, pattern recognition, operating systems and microprogramming.

Tuesday's program will include a session on maximizing disk throughput in a multi-user environment. Protection of operating systems and deadlock prevention in real-time systems will also be covered.

Networks, computer-aided instruction, concurrent processes and resource allocation and programming languages are topics scheduled for Wednesday.

"Sparse Matrix Techniques in Computer-aided Design" is the announced topic for Wednesday morning's plenary session.

Thursday's schedule includes a panel discussion of large-scale software systems. The parallel sessions will cover compilers, with a discussion on defining and implementing PL/I, microprogramming and applied mathematics.

Medical applications, graphics, pattern recognition methods and numerical mathematics will be covered Friday.

Further information is available from Dr. H. Lipps, Symposium Chairman, International Computing Symposium 1973 c/o Cern, CH-1211, Geneva 23, Switzerland.

Urban Technology Meeting Slated

BOSTON — The Third Annual Urban Technology Conference and Technical Display, co-sponsored by the American Institute of Aeronautics and Astronautics (AIAA) and Public Technology, Inc. (PTI), will be held Sept. 25-28 at the John B. Hynes Auditorium.

Displays

A technological display featuring late model systems and hardware will be situated around

problem-definition exhibits from eleven federal agencies, including EPA, DOT, LEAA and Nasa.

Topics of the displays will include computerized traffic monitoring, computerized postal handling equipment and modeling simulation and projection techniques.

Further information is available from Philip D. Schaub, Director of Communications, AIAA, 1290 Sixth Ave., New York, N.Y. 10019.

Calendar

Aug. 27-29, Atlanta — ACM 1973 Annual Conference. Contact: I.E. Perlin, Georgia Institute of Technology, 255 North Ave. NW, Atlanta, Ga. 30332.

Aug. 30, Atlanta — Workshop on Education and Computer Architecture, sponsored by ACM Sigarch and IEEE-CS TCCA. Contact: G.E. Rossmann, Department of Electrical Engineering, University of Delaware, Newark, Del. 19711.

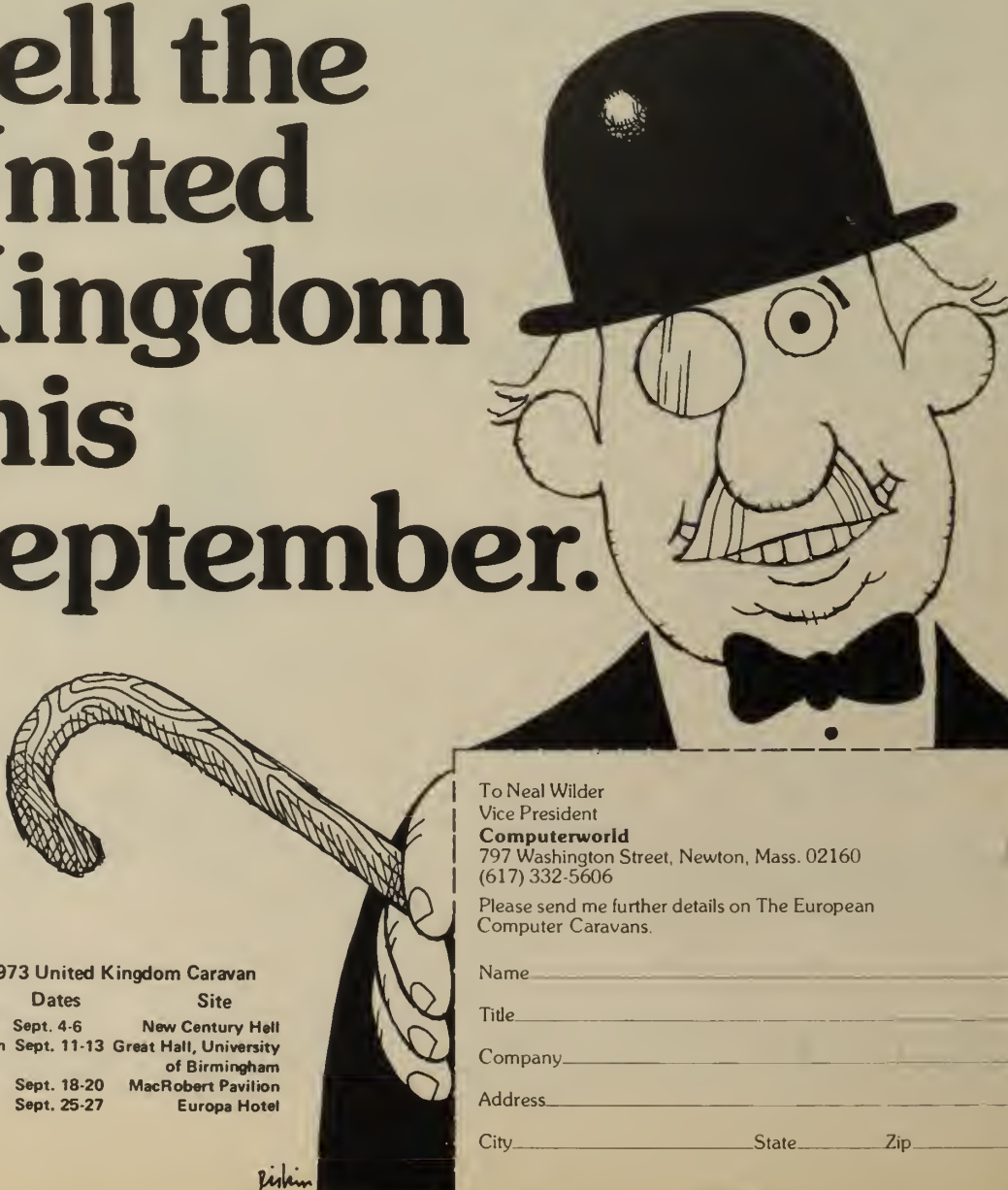
Sept. 5-6, New Brunswick, N.J. — Workshops on Computer Description Languages, sponsored by ACM Sigarch and IEEE-TCCA. Contact: Saul Levy, Department of Computer Science, Rutgers University, New Brunswick, N.J. 08903.

Sept. 13-14, Chicago — MIS Annual Conference. Contact: Society for Management Information Systems, 221 N. La Salle St., Chicago, Ill. 60601.

Sept. 17-18, Cologne, Germany — International Conference on Information Centers in Governmental and Industrial Administration and Management. Contact: Prof. Dr. P. Schmitz, Lehrstuhl für Informatik der Universität zu Köln, 5 Köln 41, Berrenrather Str. 136, G.F.R.

Sept. 24-25, College Park, Md. — ACM 6th Annual Workshop on Microprogramming, sponsored by ACM Sigmicro. Contact: John Roberts, Naval Research Laboratory, Code 5030, Washington, D.C. 20390.

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The 1973 United Kingdom Caravan

City	Dates	Site
Manchester	Sept. 4-6	New Century Hall
Birmingham	Sept. 11-13	Great Hall, University of Birmingham
Edinburgh	Sept. 18-20	MacRobert Pavilion
London	Sept. 25-27	Europa Hotel

Navy Building 'Common Sense' Machines

ARLINGTON, Va. — The Navy is actively working to develop computer systems with decision-making capabilities that will assist humans in the performance of tedious or hazardous tasks in some cases and replace humans in others.

While computer-assisted devices already exist within industry, a Navy spokesman said, "these machines are rigidly limited in their capabilities and usually can only do a relatively simple task in operations with long production runs."

The Navy's objective is more ambitious in trying to develop computer systems with "common sense" to perform duties such as spray painting, precision assembly, maintenance work at air stations, or manufacture and repair tasks in shipyards.

A first tentative step toward this goal has been taken with the awarding of a grant to scientists

at the Stanford Research Institute for a survey of existing state-of-the-art computer-assisted machinery.

On the opposite coast and in another direction, MIT has started building prototype systems with rudimentary human skills.

The main thrust of the MIT project is to design robots that will be able to survey their environment and move about it. These robots could not only see (by means of a television camera) and hear, but would have a sense of touch, according to the Navy spokesman.

Pick a Park With Campsite System

WASHINGTON, D.C. — Smokey the Bear says "Save yourself time and worry. Reserve a campsite in advance with the National Park Service's computer."

Almost 20,000 campsite reservations have been made in the first month of operation at six national parks: Yosemite, Yellowstone, Grand Teton, Everglades, Grand Canyon and Acadia (Maine).

American Express Reservations, Inc. provides the reserva-

tion system, using its more than 1,000 outlets.

At the time of the reservation the camper pays the campsite fee of \$2 to \$4 a night plus a service charge of \$1.50. The system covers 4,000 of the 7,000 campsites the National Park Service administers in the six parks.

"We hope to gain the experience necessary to determine if this kind of system could work for all the national parks," director Ronald Walker said.

Computer Counting Proves Fruitful

TAMPA, Fla. — "Orange" you glad there are computers? Researchers with the Statistical Reporting Service of the U.S. Department of Agriculture are, and they're using them to experiment with new methods of fruit counting. An accurate count of oranges on an orange tree is essential to good yield estimates.

It works like this: first the fruit is photographed in its natural setting. A specialized machine called a microdensitometer classifies objects in the photograph according to optical density values, with oranges assigned a different number from leaves and branches. The readings are fed into a computer which produces a printout in which the orange is identified numerically.

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ond part, which is collated with carbon and in perfect registry with the first part, consists of the input copy, printed offset in black with OCR drop-out blue.

Thus, the two documents, when collated, meet both the security requirements needed in a title, as well as the requirements of OCR readers.

Rhode Island is issuing the titles to owners of newly sold 1973 motor vehicles.

Students Learn to Name That Tune

STANFORD, Calif. — Music from a PDP-10 keyboard? That's what Stanford University music students are getting when they interact with the computer-based teaching system developed by Wolfgang Kuhn, professor of music and education.

A DEC PDP-10 is connected to a teletypewriter terminal and an electric organ; the computer drives the organ as a sound source and students input answers via the terminal identifying notes and musical phrases.

Many aspects of the lessons are up to the student. He can change strands or topics; skip problems; make up individual problems; reset the organ's key, time value or keyboard; transpose examples; or get a statistical "report card" on progress.

Mail to Yale Alumni Eased By Records Data System

NEW HAVEN, Conn. — Special mailings from Yale University to groups of its alumni used to be a real headache. Clerks often would spend weeks pulling the proper address plates from master files, and additional weeks updating the files and refiling the address plates.

Today, Yale gives more personal attention to its alumni and leaves the paperwork to an IBM 360/67 and Yards, the Yale Alumni Records Data System.

The system prints mailing labels for the alumni magazine, provides lists of classmates to alumni groups, aids in the election of representatives from local Yale Clubs to the Association of Yale Alumni and helps in fund raising.

"One of Yards' most important contributions in fund raising is the flexibility it gives Yale in devising special campaigns," said Wesley Poling, director of alumni records.

One example of the program's flexibility is its ability to contact by mail all

Law School graduates whose average annual contribution has exceeded \$100, for a special Law School building fund campaign.

'Perfect' Roommates Paired

MANKATO, Minn. — Computers have been matching ideal dates and mates for some time, and are now moving on to matching college roommates.

Students living in Mankato State College residence halls are filling out question-

From the Campuses

naires on their residence hall preferences, visitation preferences and desired roommate personality traits.

The questionnaires will be processed by computer and students will be matched as closely as possible to individual wishes, according to Chester Carkoski, MSC housing director.

The program is expected to help freshmen by eliminating avoidable personality conflicts such as those caused by putting an "early bird" and a "night owl" in the same room.

CPU Is Fourth for Bridge

DALLAS — The computer may never be another Goren, but it is learning to play the game.

Two Southern Methodist University students, Jeff Karpeles and David Wisler, are programming a computer to play bridge. It can already set up a display bridge hand and bid, but now they would like to see the computer "learn" from each player.

The computer plays only as well as the program fed into it, so the students are trying to analyze their own moves to improve the computer's game. So far, the students are winning every rubber.

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CI Notes

Univac Shipping 70s

BLUE BELL, Pa. — The Series 70 systems, formerly RCA's and now tended by Univac, are alive and well, according to figures released by Univac.

Over \$70 million in shipments has been made since the end of 1972, and the total shipments of Series 70 systems since Univac acquired the customer base in January 1972 exceeds \$200 million, Univac said.

"In addition, \$53 million of on-order equipment, mostly upgrades of installed systems, will be shipped within the next few months," according to Aaron Henken, director of Series 70 operations.

IBM Sole California Bidder

CW West Coast Bureau

SACRAMENTO, Calif. — IBM was the only firm to submit a bid last week for the Stephen P. Teale computer center that will consolidate the DP operations of several large state agencies.

A field of 12 companies had indicated their intentions to bid for a contract expected to be worth \$40 million. All but IBM dropped out in recent months.

A state official said a technical proposal and cost proposal were received, and only after the technical data has been evaluated will the cost proposal be opened, possibly within the next week.

The state legislature has specified that there must be at least two qualified bidders and at least two different mainframes before a contract is awarded. It is not known how the Department of Finance will resolve this problem if IBM's bid is validated.

NCR Joins Multinational Data

DAYTON, Ohio — National Cash Register Co. has joined Control Data Corp., International Computers Ltd., and Compagnie Internationale pour l'Informatique as a partner in Multinational Data S.A., a joint study company.

NCR has assumed a 25% interest in the unit, which was formed in May 1971.

DEC Sues Lockheed, Again

MAYNARD, Mass. — Digital Equipment Corp. has filed suit in U.S. District Court in Boston charging Lockheed Electronics Co. with patent infringement.

DEC charges that techniques used in Lockheed's SUE minicomputer infringe on the Unibus used in its PDP-11.

Digital has requested an injunction against further infringement.

Lockheed said it had not seen the court papers and was unable to comment.

Digital said this suit is not related to its infringement suit against Lockheed concerning addressing techniques in SUE, which was settled out of court [CW, May 23].

To Prevent Thrashing, Documents Say

IBM 370s to Get Hierarchical Memories

By E. Drake Lundell Jr.
Of the CW Staff

TULSA, Okla. — IBM is now developing a Hierarchical Memory System (HMS) for the 370 computer line because, among other reasons, 370s with virtual memory will need more real memory to prevent thrashing, according to IBM documents released here in conjunction with the Telex trial.

Basically the HMS systems will allow 370 users to upgrade the size of their main memories. On the 145 the HMS will allow up to 2M bytes; on the 155 up to 4M bytes; and on the 165 and 195 up to 8M bytes.

"HMS will provide the vehicle for very large memory systems," according to the documents, and "it will enable many more program elements to be resident. For large communications systems in a relocate environment, large real memory will allow more pages per user to be resident, which will in turn be reflected to the user as better response time."

"In the high data base environment large memory will enhance data staging and make it a more powerful concept," the papers added.

The technology used in the HMS is MOS-FET and MST-2, the IBM papers indicated, with both Random Access and

TULSA, Okla. — What will the new Hierarchical Memory Systems (HMS) cost users? Plenty, but not as much as 360 memory or earlier 370 memory, according to IBM documents released at the Telex/IBM trial.

To upgrade a 256K 145 to a 768K system with an HMS will cost \$470,000. The user has to have the 256K at the regular prices, but if he has more than that much memory, he will have to trade it in. To get the HMS he will have to start with 256K, no more, no less.

To upgrade the 145 to 1M bytes will cost \$690,000; to 1.5M bytes will cost \$910,000 and 2M bytes, the maximum, will cost \$1.13 million.

All 155 and 165 customers upgrading

At What Price?

to HMS will have to remove all 3360s from their systems and get all new memory of the HMS type.

To get 512K for the 155 will cost \$396,000; 1M bytes, \$836,000; 2M bytes, \$1.1 million; 3M bytes, \$1.5 million; and 4M bytes, the maximum, will cost \$1.9 million.

For the 165, 1M bytes will cost \$616,000; 2M bytes, \$836,000; 3M bytes \$1.5 million; 4M bytes, \$1.9 million, 5M bytes, \$2.4 million; and the maximum of 8M bytes will be \$3.7 million.

Deliveries of the units should begin in the first quarter of next year, if IBM holds to the schedule established in the documents.

Cost Performance FETs used, providing a memory with a cost close to the Random Access memory and performance closer to the faster Cost Performance unit.

Four Models Planned

There are four models of the new devices planned. The first is designed for the 145 and comes in 512K-byte increments.

Computer Lessors Group Protests Government's Memory Contracts

By a CW Staff Writer

WASHINGTON, D.C. — The Federal Government is losing money through strict adherence to its mandatory core memory purchase requirements, even though these requirements result in individual savings on memory modules that sometimes amount to almost 90% off the IBM price.

So charges the Computer Lessors Association, which is protesting the mandatory memory contracts because it feels they exclude its members from bidding effectively on contracts and cost the government more than is necessary.

At issue are two contracts awarded by the General Services Administration (GSA) last year that require government agencies getting new computers to purchase core memories from Cambridge Memories for 360/30s and from Ampex for 360/40s, 50s and 65s.

In addition, presently installed memory for such systems must either carry a lower price tag than that offered by one of the two firms or the agency is required to replace it with Cambridge or Ampex memory.

The mandatory requirement of the contracts could "severely restrict" the ability of third party leasing firms to do business with the government, according to the

Computer Lessors Association's letter to the GSA.

The association noted that the contract prohibits firms from bidding either at or below the listed Cambridge or Ampex prices for the same amount of memory.

"We of course feel the leasing companies must be allowed to bid OEM and compatible memory at competitive prices," the association said. It asked the GSA to amend its rules to permit such bids.

According to leasing company officials, a leasing company could offer a package of CPU, memory and peripherals to the government at a lower price than the government would pay for an identical system with memory from Ampex or Cambridge.

However, since leasing companies are now prohibited from offering memory in their packages, the price of the CPU alone would be higher than in the package deal, officials said.

The regulation means "we cannot compete for most mainframe business," according to the CLA letter.

The government's position has been that the mandatory contract will offer the greatest possible savings even though it may have to pay higher prices for mainframes.

The Model 2 is for the 155, the Model 3 for the 165 and the Model 4 will be for the 195. Models 3 and 4 have a 1M-byte incremental increase and the Model 2 is expandable by 512K-byte increments up to 2M bytes and then by 1M-byte increments up to 4M bytes.

Future units will be developed for other members of the 370 line.

"HMS-1 is always found as a single stand-alone frame," the IBM documents showed, but "HMS-2, 3 and 4 require an interface frame in addition to the storage frame," they added.

"HMS, as viewed from the external CPU interface, is similar to other memory products. It has data busses in and out, an address bus, operational lines, etc., and has a set of specification numbers identifying access time, cycle time, etc.," the documents said.

"Inside the interface, however, are two different memory arrays that are organized to form a hierarchy," they stated.

"Conceptually it is quite similar to the buffer backing store idea introduced by the M85, and followed by the M155, M165 and M195.

"Because HMS is a two-level store itself, when it replaces the backing store on one of these machines, a three-level store will exist. The additional level of storage is non-addressable and will be transparent to the software, and exists only to provide the best possible cost/performance for HMS," the papers added.

The two arrays in the new system are the bulk array and the fast array, IBM said, with the first being the random-access chip array and the latter being the cost/performance chip array.

"The bulk array contains the total address space. The fast array is 1/16th the capacity of the bulk array and requires an additional companion array called a directory," the research papers said.

(Continued on Page 30)

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IBM Seeks Offices In Soviet Union

WASHINGTON, D.C. — IBM recently confirmed British reports that it was seeking accreditation from the Soviet Union to allow the firm to establish offices there.

If the IBM request is successful, it would make it the second computer company in the Western world to have offices in Moscow and other points in the USSR, and the first American company to have on-the-scene sales representatives there.

The only other computer firm from the West accredited in Moscow is International Computers Ltd.

The accreditation would also allow IBM to hire Russian nationals to work for it in the Soviet Union and the move apparently poses a challenge to ICL which has sold 22 computer systems to the Russians since opening its office there in 1971, for a total value of almost \$28 million.

Visitor Sees Soviet DP Progressing

By Molly Upton
Of the CW Staff

NEW YORK — The Soviets are making significant strides in the development of a computer industry, both in the areas of hardware development and training of personnel, according to Harold Chestnut, president of the IEEE, who recently returned from an extensive visit in the Soviet Union.

Hardware and software have moved out of R&D into the industrial environment, he observed.

Although much of the industry is just starting up, he said he thought the Russians have "turned the corner" with the Riad line of computers.

Chestnut said he sees little reason for prolonging the stringent export restrictions the U.S. has placed on computers, as the "initial difference no longer exists."

It is a less significant change from designing and manufacturing a machine that performs 50,000 operation/sec to one that performs 500,000 operation/sec,

compared to the jump from no computing capability to 50,000 operation/sec, he said.

Also, the Russians have designed the series with an eye toward software compatibility with the 360 series.

Chestnut attended several exhibits with-

From the Eastern Bloc

in the country detailing progress in manufacturing computers, and said the ex-

posure of computers to the public was relatively broad-based in this sense.

Both in the universities and factories, there are training programs for engineers and technicians, he said. There is a five year program for engineers in college, two of which are spent in an industry.

One of the keys to the motivation for the development of computer capability, according to Chestnut, is the desire to perform more effective economic planning. Currently the data is frequently out of date or not available when planners set to work.

Group Studying Export Policies

By E. Drake Lundell Jr.
CW Washington Bureau

WASHINGTON, D.C. — A report recommending eased controls on the sale of computer equipment to Eastern Bloc countries is expected later this month from a White House task force organized in the Council of International Economic

Policy.

The task group is comprised of governmental personnel, with some input from outside consultants. Thus far, one of those outside groups, the Commerce Department's Computer Systems Technical Advisory Committee, has made no official recommendations on changes in the trade policy, although there have been some unofficial "conversations" with members of that body, task force sources said.

The White House task force reportedly is trying to draw up guidelines on the export of computer equipment that would strike a balance between security needs as perceived by the Defense Department and intelligence agencies and the possible benefits to the balance of payments problems.

In the past, most requests for the export of computer equipment to the Soviet Union and other "Iron Curtain" countries have been handled on an individual basis, although there have been some general regulations.

But under those regulations, sources noted, almost any piece of equipment that could be classified as a true computer had to receive special export licenses from the Office of Export Control in the Commerce Department before it could be shipped to Eastern countries.

The special administration task force is "definitely" looking at ways to relax the present strict controls of such shipments, one source said, both by changing the definitions of items which would have to receive special clearances and by making more general ground rules available to the industry.

Several large computer manufacturers — notably IBM, Control Data, and Univac — would like to see the present controls eased, particularly in relation to third generation computer systems.

These firms see the Eastern Bloc nations as a large market for this type of equipment — particularly the older 360 systems — and would like to see the government open the door for trade there.

One possible action would be to abolish controls completely on the lower end of such families of computer systems, sources said, since there is evidence that such computer power and sophistication is available from sources outside of the U.S.

However, the question is more difficult with the larger scale computer systems. The particular worry of Defense Department officials is said to be the possible use of such systems in defense work even if originally sold to a non-defense related establishment.

One possibility under consideration by the White House task force would be to establish some way of monitoring such installations after the systems are delivered to make sure they are not diverted from the work they were sold to do.

Any recommendations on relaxing restrictions on export of computer equipment to the Iron Curtain countries must be approved by the Nato coordinating committee (Cocom) that also restricts such sales.

However, government sources have indicated Cocom was much more willing to permit such sales than was the U.S. Office of Export Control.

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Hierarchical Memory Next Step for 370s

(Continued from Page 27)

"The directory," they continued, "keeps track of which data blocks from the bulk array have been loaded into the fast array. Data movement back and forth between bulk and fast arrays consists of large blocks of data.

"The block size varies directly with capacity and is exactly 256 bytes per megabyte of bulk storage. A four megabyte HMS, for example, would move 1,024 eight-bit bytes between bulk and fast in a single bulk cycle," the documents explained.

Probability of Finding Data

"The effect of this large block transfer is that the probability of finding data in the fast array, on subsequent CPU requests, is high. This results in a box performance nearly that of a fast array only.

"The fast array," the IBM papers indicated, "is designed to operate as a four-way associative array. This means any particular data block in bulk store can be moved to one of four places in the fast array.

"The decision rule for which of the four to use is called 'least recently used' or LRU. The history of use is kept and updated in the directory and always indicates the LRU block of the four eligible ones.

"Because the bulk array is 16 times the capacity of the fast array, there are 64 data blocks competing for four spaces in the fast array. The replacement rule, LRU, keeps the four most recently used blocks of the 64 in the fast array. The 64 blocks competing for the same four spaces in the fast array comprise what is called a congruence class," the documents said.

Taking a closer look at a 512K storage module, the documents indicated "the bulk array is divided up into 64 parts,

called books. Each book consists of 64 blocks of 128 bytes each, the transferable block size (128 bytes x 64 blocks x 64 books = 512K bytes).

"The blocks are numbered 0 to 63 within each book. The fast array is divided up into 64 partitions, each of which has four associative compartments, each of which is 128 bytes... The collection of all blocks numbered 2 (one from each book) form a congruence class.

"Congruence class number 2 always maps into partition 2 of the fast array. Therefore, the four associative compartments of congruence class number 2 will always contain the four most recently used blocks (in congruence class 2) from the 64 books of the bulk array," the papers continued.

The directory then "is organized exactly the same as the fast array, but is much smaller. A directory compartment contains only a portion of the address and the control bits associated with the corresponding compartment in the fast array.

"All four compartments are read out at once for a particular congruence class and four address compares performed simultaneously to see if the required data resides in the fast array."

In all, the documents said, a CPU re-

quest for a block of data could either be satisfied in HMS by a single cycle of the fast array, by a cycle of the fast array and a cycle of the bulk array, or "by an operation called swap which requires two cycles of each array."

The HMS memory will have a varied effect on the central processors to which it is attached, the documents show, depending on size of the HMS and the system.

Simulations, the documents indicated, showed that for the 145 the addition of the HMS would slow the internal performance down by a factor of 10% on the average, but the performance of the 155 and 165 would be improved by an average of 15% with the addition and the 195 internal performance would be about the same.

However, the initial studies on I/O performance indicated this is the area with the best potential results.

"Initial studies and simulations support improved I/O performance through the use of large memories... Larger main memory also reduced the amount of I/O transfers... therefore reducing the aggregate I/O requirement. Calculations show an improvement in the I/O bandwidth of as much as 25%," the documents said.

Independents Ready To React to 3330-11

NEWTON, Mass. — Independents are planning to react more quickly than before in keeping up with IBM's disk product announcements.

The recent announcement by California Computer Products of its 1030 (See page 19), for which it has no price and no specifications, is expected to be the first in a line of similar products.

One industry source is looking for some of the independents to come out with enhancements on their double-density 3330-type units.

Several independents expressed the view that the IBM unit did not incorporate any technological breakthroughs.

A spokesman for Memorex said the firm would be making an announcement soon, and that Memorex "is not going to be far behind."

The design of the 3740, he said, gave some indication of how the new double-density unit was going to be constructed, so the 3330-11 was "not much of a surprise."

Control Data Corp. expects to decide shortly whether to manufacture such a product for the end-user market, according to Gordon Brown, vice-president, peripherals marketing.

The company is in a "very advantageous position" as it has already developed the OEM 200 M-byte disk drive, which also uses more tracks per inch, Brown said.

Brown suggested that some of the independents might circumvent the problem of interchangeability, and in the near future market a product using the same approach as companies did in bringing out the double-density 2314.

Com-Share Purchases Its Sigmas

ANN ARBOR, Mich. — Com-Share has switched to an installment purchase contract for its Xerox Corp. equipment, which consists of two Sigma 9s and seven 940s, citing control, maintenance and financing as the major reasons.

Under lease agreement, Xerox ordinarily provides all maintenance, and would not deviate from its rule in the case of the Sigmas, because it did not want to set a precedent, "even though we have a

proven maintenance capability," according to Com-Share Secretary Edward Terrieri.

"By being title holders, we can now maintain all our own equipment and we feel we can get greater reliability with inhouse maintenance," Terrieri stated.

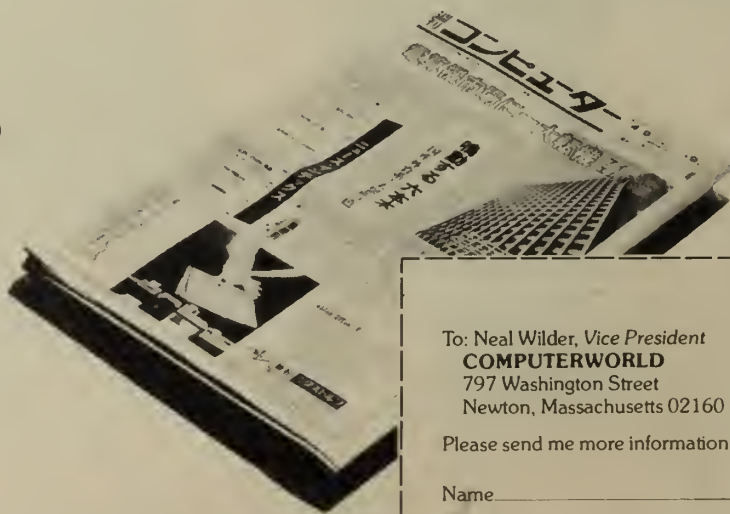
"We can now attach foreign equipment, such as disk drives, to it. These things aren't permissible when the equipment is on lease."

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- **Shukan Computer** is the only newsweekly for the fast-growing Japanese computer community.
- Initial circulation is guaranteed at 35,000, divided about 80% to end-users and 20% to the computer industry. Circulation development methods currently under way are the same as those which gave *Computerworld* the highest paid circulation in its field in less than four years.
- **Shukan** lets you in on the action in the world's fastest growing EDP market. The Japanese Ministry of International Trade and Industry (MITI) has made the following 1976 forecast: 39,000 general-purpose systems installed, up from 11,237 in 1971; 11,000 minicomputers installed, up from 1,670 in 1971; and 3,000 industrial systems installed, up from 1,086 in 1971.
- Is this growth likely? The latest census of general-purpose systems revealed that there were 14,806 systems installed as of September 1972, a one-year gain of 3,569 units and \$911 million installed value, a growth of 31.7% and 23.1% respectively. And more than 50% of these new systems were American made.
- It is true that there are import restrictions. But Japanese vendors and users can get permission to import almost anything they want and need. As a result, 1972 imports were over \$360 million.
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Pay Antitrust Penalties?

What Is IBM Going to Do With Its 'Trapped Riches'?

By George Warren

Special to Computerworld

Check with the chief financial officer of most computer manufacturers and you will probably find he has a cash flow problem.

But check the financial statements of IBM and you find it has a massive hoard of cash and near-cash reserves, expanding at an accelerating rate.

In 1972, IBM's cash and marketable securities increased by almost \$1 billion,

VIEWPOINT

to a total of about \$3.3 billion.

If IBM were a bank, it would rank as one of the country's largest.

But like a feudal baron in his sumptuous castle, under siege by his enemies, there is little IBM can do to employ its riches profitably. IBM has \$3 billion in trapped riches.

The hoard has been accumulating since the early years of factory shipments of 360 computers. The greatest growth, however, has been over the last few years.

In the last three years the amount has more than doubled.

It appears that IBM has no practical method of putting this cash to work in its business. Because of antitrust repercussions which would surely follow an increase in its share of the marketplace, IBM cannot use this money to expand its present markets.

So why is the giant of Armonk accumulating these riches?

Could it be that it expects to pay very large penalties and damages following settlement of the antitrust litigation now being waged against it?

The Telex suit alone calls for IBM to pay damages of \$1.2 billion.

With its \$3.3 billion IBM could:

- Sustain about seven years of growth comparable to that of 1972, even if earnings of the corporation should be zero during each of those years.

- Increase the size of IBM's rental base by more than 40%.

- Double its business merely by using its cash to purchase machines on the open market.

- Buy the entire Honeywell computer business — estimated as Number Two in the marketplace — and have enough left over to buy four more of similar size. In effect, IBM could probably buy all of its competition.

IBM is building its resources to the point where its primary business may no longer be the manufacture of computers, but as a financial institution, one of the country's largest.

Primary source of the cash is IBM's ever-growing earnings.

The rental and sale of computing equipment have proven immensely profitable to the giant of Armonk.

More cash flow comes from depreciation. Although it is not earned cash, depreciation is nevertheless cash, and it flows into IBM's coffers at a massive rate.

During the year 1972, IBM's capital expenditures for rental computers and manufacturing facilities exceeded the cash flow from depreciation of older investments by about \$206 million.

Net earnings of \$1.28 billion in 1972 were more than six times what was needed to make the capital investments to keep the money-generating process growing.

Even after paying out part of the earnings as cash dividends to stockholders in 1972, IBM was left with more than three times the cash it required for capital investments.

U.S. Benefits

A major beneficiary of the accumulated hoard is the U.S. Government, which regularly sells bonds to IBM.

Investment interest in 1972, about \$191 million, was almost enough, of itself, to cover the net cost of new plants and equipment and new computers.

If IBM can't use its cash to buy competitors, and if it already sponsors more development projects than it appears to need to maintain its competitive edge, perhaps its cash could be put to a less conventional use.

It could buy its own shares from existing stockholders.

By using about two-thirds of its cash and securities, IBM could purchase about 4.5 million of its shares at the current market price. Outstanding shares would be reduced by about 4%, so earnings per share would increase by the corresponding 4%.

Invest in Bonds

From IBM's financial statement, however, it appears that this 4% is somewhat less than the rate of interest IBM earns on its investments in marketable securities. The stockholders are better off allowing IBM to keep the cash, investing it in government bonds.

Yet, IBM stockholders might be expected to be unhappy about the company's hoarding of cash. IBM's rate of return on cash and securities is much less than its return from its traditional manufacturing operations.

Income from operations was \$2.23 billion in 1972. Compared to the company's investment in plant and manufacturing equipment (\$5.43 billion at year end, including cash in banks), the return on this investment is an amazing 41%.

But IBM's interest income of \$191 million on its investment of \$2.90 billion in securities returns only 6.6%. Compared with earnings from operations, IBM's investment income rate is inordinately low.

The investor in IBM stock might be expected to prefer that IBM pay its accumulated cash to the stockholders and let them, in turn, attempt to find investments yielding greater return than IBM's 6.6%.

In 1972, IBM paid dividends to stockholders amounting to \$626 million, while it increased cash and investments by almost \$1 billion. Less than half of 1972's net earnings was returned to stockholders as dividends.

To escape from its dilemma, it appears that IBM has only three legally and operationally acceptable uses for its accumulated excess cash:

- Pay antitrust fines and damages, if levied.

- Buy shares of its own common stock, on the open market.

- Distribute extra dividends to stockholders.

IBM has made no move to buy its own shares, even at today's depressed prices. Nor does it seem to have any inclination to distribute an extra dividend.

Does the computer giant expect to be required to pay substantial antitrust judgments?

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Honeywell Plans MOS Memories For 6000 Series

By Marvin Smalheiser
CW West Coast Bureau

PHOENIX — Honeywell officials disclosed plans to gradually shift all memory in its 6000 series to MOS, and hinted that Multics could be scaled down to run on "a 6140," at a dedication ceremony for a new Multics center here.

The Multics center will serve as a software facility for on-line development, maintenance and evolution of software.

Multics operates on the Honeywell 6180, an enhanced version of Honeywell's 6000 series computer and the largest machine of the series.

Marketing representatives said there are 50 to 60 prospective buyers for Multics, mostly in commercial applications, and estimated the Multics market at \$305 million.

Norman N. Feldman, vice-president of Honeywell's Computer Systems Division operations, said by the end of 1973 worldwide sales of the 6000 series will total \$500 million and a third of that will be overseas sales.

Honeywell's computer sales now are divided 50-50 between the U.S. and overseas, he added.

Another official estimated the 6000 represented better than 40% of Honeywell's total bookings and more were sold in the six months after it was announced than the GE 600 series computers in the preceding five years.

Multics, an official said, could be run alternately with GCOS, General Comprehensive Operating Supervisor, with an adjustment taking only "five minutes," but it is expected that eventually the best of the two systems will be blended together into one operating system.

At the dedication of the Multics center Honeywell announced it was inviting universities and colleges in the southwest to make use of Multics and had donated \$25,000 in Multics system time to the Arizona Board of Regents for use by colleges.

Earnings Reports

DATA GENERAL Three Months Ended June 9			
	1973	a1972	
Shr Ernd	\$.20	\$.11	
Revenue	12,940,000	7,323,000	
Earnings	1,642,000	901,000	
9 Mo Shr	.52	.28	
Revenue	33,927,000	18,969,000	
Earnings	4,290,000	2,282,000	
a-Restated to reflect a pooling-of-interests consummated in fiscal 1973.			
WABASH MAGNETICS Three Months Ended June 30			
	1973	a1972	
Shr Ernd	\$.24	\$.11	
bRevenue	8,073,604	7,139,650	
Disc Op	.....	(114,829)	
Earnings	432,273	195,087	
6 Mo Shr	.46	.22	
bRevenue	15,894,456	13,738,470	
Disc Op	.....	(215,989)	
Earnings	817,908	387,573	
a-Restated. b-From continuing operations.			
HONEYWELL Three Months Ended June 30			
	1973 (000)	1972 (000)	
Shr Ernd	\$1.10	\$.81	
Revenue	572,204	510,036	
Tax Cred	1,275	1,643	
Earnings	20,832	15,078	
6 Mo Shr	1.99	1.41	
Revenue	1,098,132	960,231	
Tax Cred	2,061	1,643	
Earnings	37,737	26,302	

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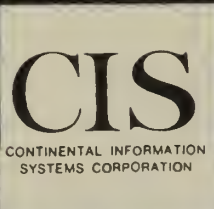
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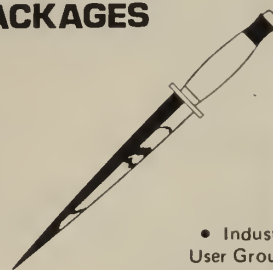
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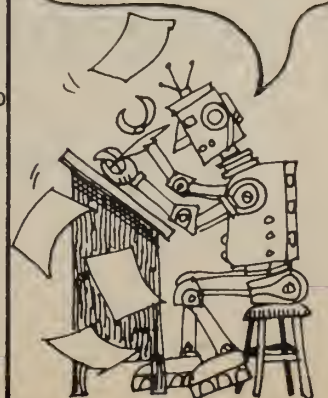
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In First Quarter

Univac Leads Sperry to Record Earnings

NEW YORK — Univac led all other areas of Sperry Rand Corp. in its march to record earnings for the first quarter ended June 30.

Revenues, earnings and orders for computers were all well

ahead of last year's first quarter, noted Chairman J. Paul Lyet.

Univac's "12-month business rate is now exceeding \$1 billion in revenue, and profitability is increasing at a comparable rate," he added.

Commercial orders are up about 30% over those in the year-ago period, he said.

Corporate earnings in the quarter rose 32%, to \$23.5 million or 68 cents a share, compared with \$17.9 million or 52 cents a share in the same 1972 period.

Revenues rose 20% to a record \$599 million from \$499.7 million a year ago.

Overall, order backlog was \$1.5 billion as of June 30, up \$350 million from the comparable date in 1972, Lyet said.

"We are keeping a close watch on all economic and business indicators, but as yet we have not experienced any slackening in what continues to be a strong worldwide demand for our products. Unless we encounter some severe and unforeseen adverse conditions, we expect the remainder of this fiscal year to be quite satisfactory," Lyet observed.

Informatics Shareholders Unhappy Over Negotiations for Firm's Sale

By Marvin Smalheiser
CW West Coast Bureau

LOS ANGELES — Shareholders of Informatics Inc. expressed emotions ranging from delight to disappointment as they were told of the company's rising profits on one hand and negotiations for its sale on the other.

Several shareholders protested the negotiations for sale to the Equitable Life Assurance Society, particularly the proposed \$6 per share price.

One shareholder said he would like to meet with President Walter F. Bauer and bring a group of investors willing to pay more than the \$6 a share.

Other stockholders were disappointed at the \$6 price because they said it was not enough to recover losses resulting from the stock's decline to about \$3 a share.

Bauer, who was not overly enthusiastic about the proposed sale of the software house, said the company would be able to grow better without the restrictions of financing in the public marketplace.

Stockholders, however, cited Informatics' lack of debt and strong cash position.

Bauer said the negotiations have been done with considerable soul-searching by management and a report on the deal is to be made by Dean Witter & Co. Inc.

The proposal, he said, was initiated by Equitable and once made could not be ignored by management without opening itself up to litigation.

He noted 51% of the share-

holders would have to approve the transaction.

Informatics' improved profit picture showed up on the first quarter report, which showed income of \$293,000 or 17 cents a share for the first quarter compared with earnings of \$133,000 or 8 cents a share for the same period last year.

Revenues were \$5.3 million for the three months ended June 30, compared with \$4.8 million for the same period last year.

Sycor Half, Quarter Earnings Jump

ANN ARBOR, Mich. — Sharp increases in revenues and earnings were the story at terminal maker Sycor, Inc. in both the second quarter and first half ended June 30.

"The strong results of the quarter are largely attributable to the steady buildup of production capability and a higher rate of shipments to both foreign and domestic customers," commented President Samuel N. Irwin.

"The revenue level of the second quarter should be sustained as worldwide demand for Sycor-produced terminals remains high," he said.

Sycor currently manufactures about 750 terminals a month, whereas about 10 months ago

the figure was 500 terminals a month, and 18 months ago was around 100 units a month, a spokesman said.

In the quarter, earnings, including a \$660,000 tax credit, totaled \$1.5 million compared with \$123,500 in the year-ago period. Revenues reached \$8.4 million, compared with \$3.1 million in the 1972 quarter.

Six-month earnings, including a \$1.1 million tax credit, totaled \$2.5 million compared with \$159,200 in the same period last year.

Revenues rose to \$14.9 million from \$6.1 million.

"For the balance of the year, our strategy includes continued expansion in the U.S. and Canadian markets," Irwin said.

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Correction

Mohawk Data Sciences Corp.'s 1972 revenues totaled \$143.2 million compared with \$119.8 million in 1971.

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- Channel operations.
- User experiences with IBM 3330 replacements.
- What to ask when the floppy disk salesman comes calling.

If you want to keep up with this fast changing area, our August 29th Storage Supplement will be important reading. And if you're marketing products in this area, your ad should be there. For more information, contact your nearest **Computerworld** Representative. Or write to Judy Milford, **Computerworld**, 797 Washington Street, Newton, Mass. 02160. Supplement close is August 10th.

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Three Months Ended March 31		
	1973	a1972
Revenue	\$3,610,681	\$2,843,609
Loss	76,417	546,971
9 Mo Rev	10,386,620	7,353,687
Loss	226,273	1,762,987
a-Restated.		

INFORMATION INTERNATIONAL		
Year Ended April 30		
	1973	1972
Shr Ernd	\$.35	\$.07
Revenue	6,854,144	3,899,324
Spec Cred	537,389	81,000
Earnings	903,124	185,735

DATA TECHNOLOGY		
Year Ended April 28		
	1973	1972
Shr Ernd	\$.10	.....
Revenue	12,942,000	\$11,315,000
Disc Op	.....	(90,000)
Spec Cred	.....	a84,000
Earnings	117,000	5,000
a-Gain from disposition of businesses.		

COMPUTER DATABANKS		
Year Ended Dec. 31		
	1972	1971
Shr Ernd	\$.21	\$.08
Revenue	1,301,596	1,217,619
Earnings	93,633	31,802

BURROUGHS		
Three Months Ended June 30		
	1973	1972
Shr Ernd	\$.97	\$.80
Revenue	314,319,000	252,030,000
Spec Cred	a50,000	.....
Earnings	26,161,000	20,307,000
6 Mo Shr	2.35	1.75
Revenue	588,754,000	472,632,000
Spec Cred	a2,475,000	.....
Earnings	44,932,000	32,467,000
a-From sale of securities.		

RECOGNITION EQUIPMENT		
Three Months Ended April 30		
	1973	a1972
Shr Ernd	.....	\$ .02
Revenue	\$10,516,000	9,945,000
Spec Item	d(638,000)	b44,000
Earnings	(938,000)	99,000
6 Mo Shr	.....	.04
Revenue	18,033,000	18,612,000
Spec Item	c498,000	b264,000
Earnings	(458,000)	196,000

a-Restated. b-Tax-loss carryforward credit. c-Credit gain on sale of securities in Docutel Corp. and tax credit, less reserve for investment in Datacraft Corp. d-Reserve for investment in Datacraft and adjustment to income tax benefit reported in prior quarter.

ROCKWOOD COMPUTER		
Year Ended March 31		
	1973	1972
Shr Ernd	.....	\$ .57
Revenue	\$47,110,000	47,626,000
Spec Cred	228,000	417,000
Earnings	(32,894,000)	1,998,000

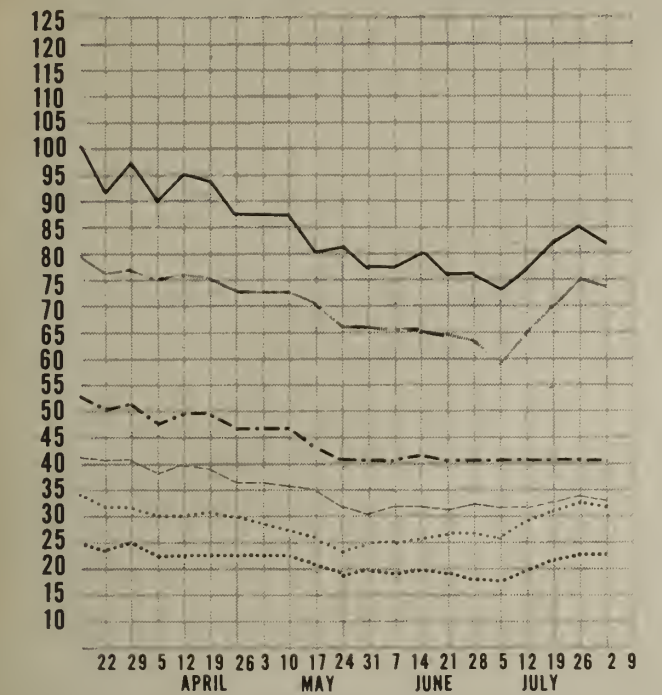
TEKTRONIX		
Year Ended May 26		
	1973	a1972
Shr Ernd	\$1.92	\$1.38
Revenue	198,197,000	164,267,000
Earnings	15,673,000	11,218,000

a-Restated to include gains from currency fluctuations as ordinary income.

IBM		
Three Months Ended June 30		
	1973	1972
Shr Ernd	\$2.44	a\$2.15
Revenue	2,546,665	2,364,847
Earnings	356,718	312,197
6 Mo Shr	4.78	a4.27
Revenue	4,997,176	4,677,097
Earnings	696,850	617,904
a-Adjusted to reflect five-for-four stock split in May 1973.		

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TRADE QUOTES

Computerworld Stock Trading Summary

All statistics compiled, computed and formatted by
TRADE★QUOTES, INC.
Cambridge, Mass. 02139

COMPUTER SYSTEMS						SOFTWARE & EDP SERVICES					
E	X	C	H	1973	CLOSE	WEEK	1973	CLOSE	WEEK	1973	CLOSE
				RANGE	AUG 02	NET		RANGE	AUG 02	NET	
				(1)	1973	CHNGE		(1)	1973	CHNGE	
N	BURROUGHS CORP			211-245	227 5/8	-12 7/8	-5.3	O	ADVANCED COMP TECH		
N	COLLINS RADIO			16-26	19 3/4	-3/4	-3.6	A	APPLIED DATA RES.		
O	COMPUTER AUTOMATION			5-16	10 3/4	-1 3/8	-11.3	O	APPLIED LOGIC		
N	CONTROL DATA CORP			31-62	37 1/8	-1 3/4	-4.5	N	AUTOMATIC DATA PROC		
O	DATA GENERAL CORP			28-46	41 1/2	+1	+2.4	O	BRANSON APPLIED SYST		
O	DATAPoint CORP			11-21	12	-1	-7.6	O	CENTRAL DATA SYSTEMS		
O	DIGITAL COMP CONTROL			2-6	3 1/4	-1/4	-7.1	O	COMPUTER DIMENSIONS		
N	DIGITAL EQUIPMENT			73-105	91	-2 1/2	-2.6	O	COMPUTER DYNAMICS		
N	ELECTRONIC ASSOC.			4-9	5 1/4	-3/8	-6.6	O	COMPUTER HORIZONS		
A	ELECTRONIC ENGINEER.			6-11	9 5/8	+1/8	+1.3	O	COMPUTER NETWORK		
N	FOXBORO			23-35	34 3/8	-1/8	-0.3	N	COMPUTER SCIENCES		
O	GENERAL AUTOMATION			22-55	33	-1 1/2	-4.3	O	COMPUTER TASK GROUP		
O	GRI COMPUTER CORP			1-3	1 1/4	-1/8	-9.0	O	COMPUTER TECHNOLOGY		
N	HEWLETT-PACKARD CO			74-95	87	-1	-1.1	O	COMPUTER USAGE		
N	HONEYWELL INC			98-139	114 3/4	-3 1/8	-2.6	O	COMRESS		
N	IBM			299-340	313	-5 3/4	-1.8	O	COMSHARE		
O	INTERDATA INC			7-13	8 1/2	-3/8	-4.2	N	COROURA CORP		
N	MEMOREX			2-19	4 7/8	0	0.0	O	CYBERMATICS INC		
O	MICRODATA CORP			2-10	3 3/8	-1/4	-6.8	O	DATA TAB		
N	NCR			27-38	37 3/4	-1/8	-0.3	A	ELECT COMP PROG		
N	RAYTHEON CO			22-34	25 5/8	+1/8	+0.4	N	ELECTRONIC DATA SYS.		
N	SINGER CO			45-74	54	-3	-5.2	O	INFONATIONAL INC		
N	SPERRY RAND			36-50	45 7/8	-1/8	-0.2	O	INFORMATICS		
A	SYSTEMS ENG. LABS			3-8	3 3/4	-1/2	-11.7	O	I.O.A. DATA CORP		
O	TEXAS INSTRUMENTS			83-109	105 1/4	+1/4	+0.2	O	IRS COMPUTER MARKET		
O	ULTIMAC SYSTEMS INC			1-11	3 3/4	-1 1/4	-25.0	O	KEANE ASSOCIATES		
N	VARIAN ASSOCIATES			10-20	12 3/4	-1 1/8	-8.1	O	KEYDATA CORP		
N	WANG LABS.			13-34	21 1/8	+1 3/8	+6.9	O	LOGICON		
N	XEROX CORP			141-169	158 1/4	-3 1/4	-2.0	A	MANAGEMENT DATA		
LEASING COMPANIES						PERIPHERALS & SUBSYSTEMS					
A	BOOTH COMPUTER			1-5	1 1/2	-1/4	-14.2	N	ADDRESSOGRAPH-MULT		
O	BRESNAHAN COMP.			1-2	1 1/4	0	0.0	O	ADVANCED MEMORY SYS		
O	COMISCO INC			6-17	7 1/4	-1/8	-1.6	N	AMPEX CORP		
O	COMMERCE GROUP CORP			3-4	4 1/8	-1/8	-2.9	O	ANDERSON JACOBSON		
O	COMPUTER EXCHANGE			1-1	1 1/2	0	0.0	O	BEEMIE MEDICAL ELEC		
A	COMPUTER INVSTRS GRP			2-8	2 1/2	-1/8	-4.7	A	BOLT, BERANEK & NEW		
O	COMP. INSTALLATIONS			1-2	1	0	0.0	N	BUNKER-RAMO		
M	DATRONIC RENTAL			2-3	2 1/8	0	0.0	A	CALCOMP		
A	OCL INC			1-3	1 1/8	-1/8	-10.0	O	CAMBRIDGE MEMORIES		
A	OCARBORN-STORM			12-26	20	+3 1/8	+18.5	O	CENTRONICS DATA COMP		
N	ORF INC			5-9	6 1/8	-5/8	-9.2	O	CODEX CORP		
O	EOP RESOURCES			1-3	1 3/4	0	0.0	N	COGNITRONICS		
A	GRANITE MGT			2-6	4 1/4	-1/4	-5.5				
A	GREYHOUND COMPUTER			3-6	4 5/8	0	0.0				
A	ITEL			4-12	5 3/8	-5/8	-10.4				
N	LEASCO CORP			8-18	10 1/4	-1 1/8	-9.8				
O	LEASPCORP			2-8	2 7/8	+1/8	+4.5				
O	LECTRO MGT INC			1-2	1 1/4	0	0.0				
O	NRG INC			6-15	5 1/2	-1/8	-2.2				
A	PIONEER TEX CORP			5-8	5 1/4	-1/8	-2.3				
SUPPLIES & ACCESSORIES						PERIPHERALS & SUBSYSTEMS					
O	BALTIMORE BUS FORMS			5-9	5 1/4	-3/4	-12.5	N	ADDRESSOGRAPH-MULT		
A	BARRY WRIGHT			6-13	7 1/4	-3/4	-9.3	O	ADVANCED MEMORY SYS		
A	DATA DOCUMENTS			17-22	20 5/8	+1 3/8	+7.1	N	AMPEX CORP		
O	DUPLEX PRODUCTS INC			7-10	8 1/2	-1/4	-2.8	O	ANDERSON JACOBSON		
N	ENNIS BUS. FORMS			5-8	5 3/4	+1/4	+4.5	O	BEEMIE MEDICAL ELEC		
O	GRAMMAGNETICS			9-20	12	-1 3/4	-12.7	A	BOLT, BERANEK & NEW		
O	GRAPHIC CONTROLS			8-12	9 5/8	0	0.0	N	BUNKER-RAMO		
N	3M COMPANY			78-89	85 5/8	+5/8	+0.7	A	CALCOMP		
O	MOORE CORP LTO			53-60	55 1/2	-1/2	-0.8	O	CAMBRIDGE MEMORIES		
N	NASHUA CORP			42-58	50 3/8	-1 3/8	-2.6	O	CENTRONICS DATA COMP		
O	REYNOLDS & REYNOLD			40-51	48	-7/8	-1.7	O	CODEX CORP		
O	STANARD REGISTER			14-20	14 1/2	-1	-6.4	N	COGNITRONICS		
O	TAB PRODUCTS CO			10-23	9 1/2	0	0.0				
N	UARGO			15-23	16 3/4	-1/2	-2.8				
A	WABASH MAGNETICS			5-7	6 3/8	-1/4	-3.7				
N	WALLACE BUS FORMS			15-26	18 5/8	-3/8	-1.9				

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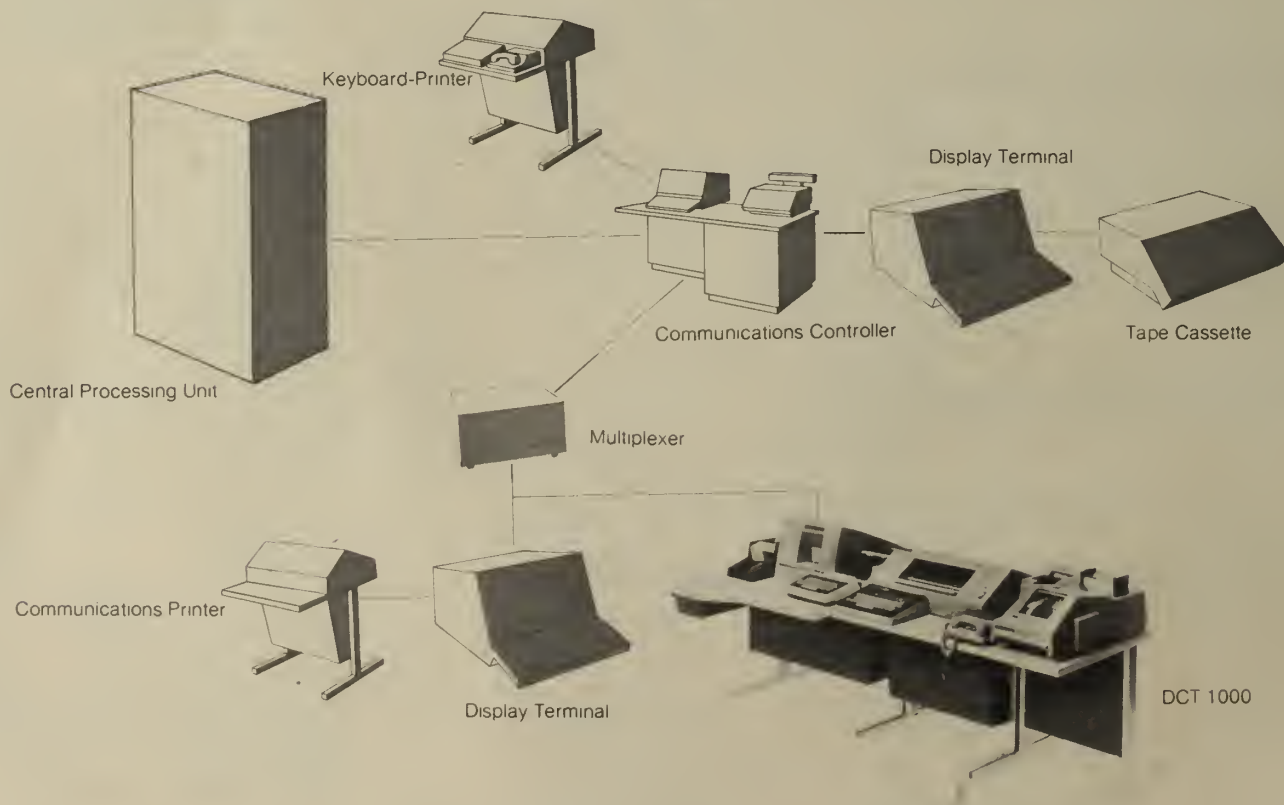
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